Think

April 1974

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Letter from the Chairman

Fellow IBMers:

IBM is traditionally thought of as a "young" company—and we are. Largely because of our dramatic growth and recruiting during the '50s and '60s, our average age is younger than most other big companies.

But early this month, when I attended the annual Corporate Awards Dinner, honoring some of our most creative people, I was struck by the number of veteran IBMers among the guests. As it turns out, nearly half our current IBM Fellows as well as a good many of our Outstanding Invention and Outstanding Contribution Award winners have more than twenty years of service.

This confirms again something that is important for us all to remember: that youth has no exclusive claim to imagination, intellect, energy, or enthusiasm. Wherever I travel in IBM, I see long-service people very much involved in critical projects. They have earned our respect, not for their tenure so much as for their continuing day-to-day contributions to the business and its future.

I believe that we enjoy the best of both worlds. We are a young company, but we also know the value of, and profit from, the special wisdom of experience.

Frank Cary

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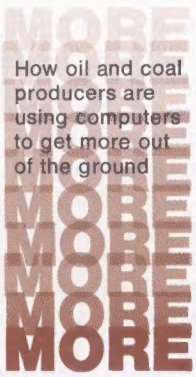

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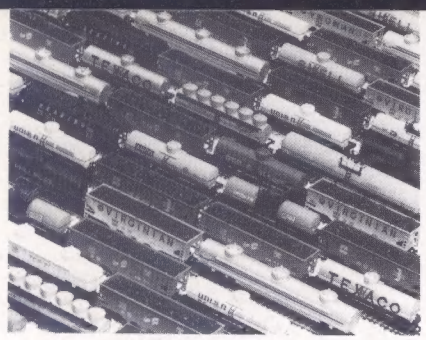

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THE WORLD

Now it's two worlds in World Trade 4

"It's a matter of dealing with success and size," said Chairman Frank T. Cary in announcing a restructuring of IBM's operations abroad. Between 1950 and 1973, the IBM World Trade Corporation had compiled a hundredfold increase in gross revenue, from $51-million to over $5-billion. To better manage such growth, the company has created two new subsidiary corporations: IBM World Trade Europe/Middle East/Africa and IBM World Trade Americas/Far East.

Heading the two corporations are IBM Senior Vice Presidents Jacques G. Maisonrouge, and Ralph A. Pfeiffer, Jr., who was president of the Data Processing Division. John F. Akers, formerly DPD field operations vice president, succeeds Pfeiffer.

For some 122,000 IBMers in 126 countries, the World Trade change will mean faster decision-making and shorter lines of communications. As Cary puts it, the new structure is in keeping with World Trade's "explosive growth and promising future."

THE COMPANY

Ten years ago—System/360 10

Ten years ago this month, Thomas J. Watson, Jr., then IBM chairman of the board, stood before more than 200 members of the press in Poughkeepsie and introduced them—and the world—to System/360.

With impetus from this new, dramatically different product, IBM moved into the front rank of American corporations. It was ranked ninth in 1964 on the *Fortune* 500, moved up to fifth place by 1970.

Watson called System/360 "the most important announcement IBM has ever made," and later events seemed to bear him out. There are those who say that its introduction changed the entire concept of computers forever.

Press reaction ranged from straight reporting to the ecstatic, and one newspaper went to far as to call it "the announcement heard 'round the world."

The recruiters are back 34

After some relatively slow hiring years, IBM is signing on people in large numbers, many of them from college campuses throughout the nation. Last year IBM hired 13,000 men and women. This year the figures should be about the same.

IBM recruiters have their work cut out for them. Competition for technical talent, a prime objective, is heavy.

Far outweighing questions about lawsuits or white shirts, are students' concerns that they will get lost in the bureaucracy of a large company.

"You can talk until you're blue in the face," says an experienced recruiter, "and they just don't believe that individual recognition exists in IBM until they see it for themselves."

How is IBM doing? About one out of every 10 students the company interviews is offered a job. And a hefty 70 percent accepts.

It's Club-time again 41

On March 10, the Office Products Division kicked off its Hundred Percent Club (a real bell ringer, by all accounts) in Miami Beach, and unofficially launched IBM's recognition-meeting season in the United States.

What started out years ago as the "Go Getters Club," then became the Hundred Percent Club, now has been shaped and expanded to meet the needs of many different functions and divisions. This year, throughout the world, there will be nearly 40 different recognition meetings for IBMers. The first was SRA's Club in January in Mexico City. The last will probably occur in the fall. If it's a long way between Miami Beach and, say, Palma de Mallorca in Spain, where OP Europe customer engineers and salesmen gathered late last month, the traditions, the awards, the camaraderie, the pulse-raising music, the speeches are very much the same.

In a special section on recognition meetings, *Think* chronicles the history of the Hundred Percent Club (which will be 50 years old in 1975), examines some of what has been done over the centuries to reward achievers, and takes a look at five meetings held this past month.

SPECIAL SECTION

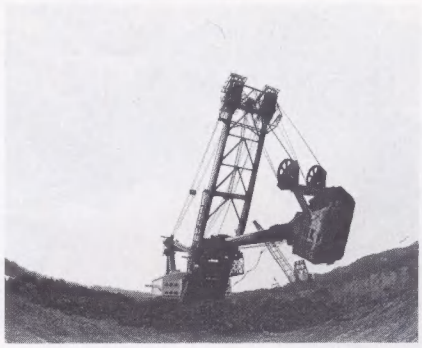
How computers help get more oil and coal out of the ground 12

The embargo may be over, but the memory lingers on—a memory of the United States' partial dependence on overseas oil to help fuel the mighty engine of its economy.

What's more, many feel that this country has come to the sobering realization that the spendthrift ways of the past—in which energy consumption grew in enormous leaps—must be curbed. New supplies of fuel must be found. And more must be done with what is available.

In a special section, *Think* presents a trio of articles prepared by Pulitzer Prize winner, William Longgood, which tell of new ways of finding oil, refining it, and of the scientifically aided resurgence of old King Coal.

In all these operations, computers are helping producers do better. In oil exploration, they analyze seismographic "bright spots." In refineries, they monitor the myriad processes by which crude becomes gasoline. And far below ground, they are making the mines safer.



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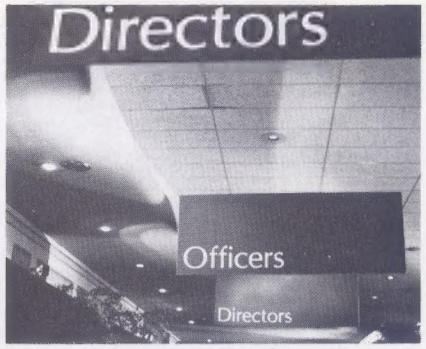

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THE MARKETPLACE

There's no other element like it **26**

Labanotation, as any choreographer will tell you, is a system for recording human movement. And, until recently, it had a serious drawback: the final manuscript usually had to be done manually by a specially trained artist.

No more. After nearly eight years of collaboration between a group of dancers and notation directors and a team of IBMers in Lexington, a special Labanotation element has been produced for the IBM Selectric Typewriter.

Is there a market for this unusual device? There is. There are 90 universities alone that teach the dance, and all of them are potential customers. But because Labanotation can be used to record not only the dance but all forms of human movement, there are those who foresee a long-term growing market for the new element in everything from work and motion studies to athletics.

MANAGEMENT VIEWPOINT

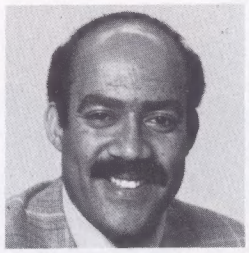
Frank T. Cary on equal opportunity **32**

In guaranteeing equal opportunities for blacks and other minorities, IBM has, from time to time, been suspected of reverse discrimination—of making minority status a plus when it comes to sizing up one person over another.

Not so, says IBM's chairman, Frank Cary, and he spells out the reasons clearly in excerpts from an interview conducted by the magazine, *Black Enterprise.*

"Anybody's who's made it, in terms of becoming a manager," said Cary, "has made it because he or she was competent. We think that's the only way you can run a business long-term."

NOTES



Jim Hicks

The 1,000th graduate of IBM's New Managers' School, Southbury, Conn., turns out to be Jim Hicks, a 32-year-old former systems engineer from the Data Processing Division's Los Angeles Wilshire office, according to George Leyden, director of the 10-month-old school. Hicks, a U.S.C. graduate with a degree in electrical engineering, is married with two children. He has returned to Los Angeles where he is currently instructional manager of the Urban League Training Center that has a remarkable record of placing 97.2 percent of the economically disadvantaged people who have graduated from that school. Hick's manager, Will Valley, equal opportunity programs manager for DPD's Western Region, says of Hicks: "He is the kind of guy who wants to help people and he is proficient in the use of computers. He should do a first-rate job as head of that Center." Of the 1,000 new managers who have graduated from Southbury, as of April 1, 14 percent were women and 11.7 percent were minority group employees.

The first desk-top typewriter with an electronic memory, the Office Products Division's new IBM Memory Typewriter looks to be a winner. Announced by the division March 1, the machine has been selling at a brisk clip (and that in spite of the fact that top OPD sales reps were attending the Hundred Percent Club in Miami for a week).

According to one enthusiastic Midwest OPD branch manager: "It's an unbelievable machine. And one of the best things about it is that you can pick it up, carry it into the customer's office, and demonstrate it on the spot."

A story on how the machine was developed will appear in a forthcoming issue of Think.

Doug Van Schaik is 30 years old, has been an OPD marketing rep for six years, and—like every marketing rep—wanted to help get his Fairfield, N.J., branch into the 1973 Hundred Percent Club. And the branch made it. Van Schaik, himself, has qualified for the Club every year, served as director twice, and exceeded quota each year in every category—except one (supplies, in 1970). But, he had to start 1973 installing equipment he'd sold. He had obligations to fulfill as 1972 Club President, at a World Trade Club and the Golden Circle. He had two weeks' jury duty. By the end of May he had scarcely started selling. What to do? He isolated himself and the records he keeps in his VW squareback "office," plotted his course, and got going. Result: He not only helped get his office into the largest OPD Club ever, but in seven months achieved 218 percent of total quota to become the first person in OPD Club history to succeed himself as president. *(For Club/Forum coverage, see page 41.)*

World Trade's world has been divided in two. After a quarter-century of dramatic growth abroad, IBM has restructured its operations outside the U.S. The rationale: to help top management focus more closely on the company's worldwide business in 126 countries.

With an eye toward future growth, two new operating units have been created:

- The IBM World Trade Europe/Middle East/Africa Corporation, under Chairman and Chief Executive Officer Jacques G. Maisonrouge, IBM senior vice president;
- The IBM World Trade Americas/Far East Corporation under Chairman and Chief Executive Officer Ralph A. Pfeiffer, Jr., newly elected IBM senior vice president and previously president of the Data Processing Division.

At an announcement meeting for some 700 World Trade Corporation (WTC) managers in New York City's Commodore Hotel, IBM Chairman Frank T. Cary explained the move succinctly: "It's a matter of dealing with success and size and keeping the operating units as manageable as possible. We're here because of the tremendous record."

The record has been bold, indeed. Gross revenue in World Trade jumped from $51-million in 1950 to $1-billion-plus in 1965, and over $5-billion in 1973—a hundredfold increase in less than 25 years. At the same time, World Trade's population climbed from 8,000 to 122,000. Since 1970, WTC has contributed more than half the corporation's net profits, and last year, almost half of IBM's gross revenue.

"No single management team can ride herd day by day, in detail, on such a great and growing business," explains Cary. "The change means decentralization, a shortening of communications lines, and the pushing of decision-making as close as possible to the point of action. And that's all to the good, given World Trade's explosive growth, increasing competition, problems with economic nationalism, and marketplace demand."

The change, in fact, was evolutionary. In March 1972, Europe and

NOW IT'S TWO WORLDS IN WORLD TRADE

Americas/Far East were set up as two operating groups within the IBM World Trade Corp. Now they constitute the core of two separate corporations, each with its own profit responsibility and its own board of directors. Maisonrouge and Pfeiffer report to the Corporate Office in Armonk through IBM Vice Chairman Gilbert E. Jones.

Instead of being a profit center, the IBM World Trade Corp., in New York City, becomes a service corporation under IBM Vice President Richard C. Warren, general manager. Some 400 staff people will provide support to World Trade countries in accounting, treasurer functions, and information systems.

Jones is chairman of the board of WTC, and Maisonrouge, president.

The announcement came on a sunny 70-degree spring day in New York City and, almost simultaneously, at European Headquarters in Paris.

Preparations for the announcement —mostly personnel placement—had actually taken four months. Said Maisonrouge: "We have been deeply concerned about every individual. Everyone will know his or her next assignment within 48 hours."

Cary praised Maisonrouge and Pfeiffer as "two of the finest leaders in the IBM Corporation. *(See page 6.)* "During 1971 and 1972," he said, "Ralph turned the Data Processing Division around in a very spectacular way and gave the division fine leadership—as fine as it has ever had."

The IBM chairman credited Maisonrouge for the "brilliant leadership he has brought to World Trade. Jacques, Dick Watson, and Gil Jones are the men behind these great achievements . . . Jacques is not only a great leader. He's clever, too. He's the only man I know who managed to return to France heading a $4-billion corporation."

Maisonrouge, who received a standing ovation when he was introduced, will be based in Paris as president and chief executive officer of IBM Europe. "We have achieved our first goal," he said with a broad smile. "World Trade passed the U.S. company. Now we have a second goal—to have IBM Europe take the lead." ■

The two head men of the two new worlds

Jacques G. Maisonrouge is talking about the influence of IBM overseas. His expressive face assumes a mock serious look. "It's not *just* our computers, you understand," he says. "I remember when a European businessman didn't know what a flipchart was. And now? Just about everybody is using them."

As much as any other executive in the company, Maisonrouge, Paris-born but a resident of the United States for 10 years, is known for combining a crisp, straight-to-the-heart-of-the-matter approach with a sense of humor which colleagues describe simply as "delightful."

He is also an internationalist in the truest sense of the word. A Frenchman through and through, he nevertheless has a great affection for his second country, the U.S., and believes that borders and other boundaries should mean little when men and women are working together toward a common goal.

Now 49, Mainsonrouge joined IBM France three years after the end of World War II, studied electronics in the U.S. on a French government scholarship (a daughter was born in Endicott), then returned to Paris in 1949, the year that the IBM World Trade Corporation was established.

He saw the introduction of the first IBM computer into Europe, then served in various capacities, including IBM Europe manager of market planning and research; regional manager; WTC vice president and president; and IBM vice president, then senior vice president.

Through all of these jobs, Maisonrouge, who was trained as an engineer, has worked to counter a certain naiveté that has existed in the U.S. company with regard to World Trade and its markets. "It's imperative," he says, "that IBMers at all levels everywhere bear in mind the often very different requirements of our overseas customers."

Although the headquarters of the World Trade Europe/Middle East/Africa Corporation will be in the U.S., Maisonrouge, in his capacity as president and chief executive officer of IBM Europe, will be based in Paris.

On the morning that his new assignment was announced, Maisonrouge spoke ruefully about leaving, even though he would be returning home. "After perfecting my English so that I speak without a trace of an accent," he said with a straight face, "I am going back to Paris to re-learn French."

"What is it that makes people follow one person and not another, accept one individual's solution and not another, buy one company's product and not another? It comes down to leadership."

This is the view of Ralph A. Pfeiffer, Jr., who for three and a half years worked to instill a spirit of leadership into his marketing organization. As president of the Data Processing Division, he instituted a program to recognize IBM's marketing leaders from across the country every month. They and their spouses were invited to New York for a weekend on IBM and lunch in White Plains with the division president. The top district for the month was awarded a crystal glass eagle as a symbol of its sales leadership. Perhaps most importantly, at headquarters luncheons, sales classes, and Hundred Percent Clubs, Pfeiffer talked about what it takes to make a leader. And as soon as he heard about an important sales achievement, he was on the phone to congratulate the winner personally.

"We can't just look at the challenges that surround us and satisfy ourselves with cool analysis," Pfeiffer once told a national meeting of branch managers. "We have to believe we can master those challenges. And we have to act boldly to achieve that mastery."

During 1972 and 1973, under Pfeiffer's leadership, DPD achieved all its major business objectives.

System/370 started selling even better than expected. Virtual storage got off to a good start and consistently met sales and installation objectives. Revenues moved up, and expenses were kept under control. Pfeiffer not only tightened the management of the division—including several regional and headquarters reorganizations, but he spread a philosophy of customer partnership. Its key tenet was simple: "Get to know your customer's business, view his business as he does, then strive to develop data processing applications that enhance his business."

Pfeiffer, 47, who took over the division in late 1970, joined the company in 1949. For his first two years as a salesman, went to law school at night. He was a branch manager, district manager, and regional manager with DPD, then IBM director of marketing. He was IBM vice president, corporation operations staff, when tapped to return to the division as its president. "What our sales men and women and systems engineers have achieved," he says, "is monumental."

THE TERRITORIES

Europe/Middle East/Africa

Jacques G. Maisonrouge is chairman and chief executive officer of a corporation that includes some 87,000 IBMers in 82 countries; with 13 manufacturing plants, 307 sales offices, 24 card plants, 6 development labs, 8 scientific centers, 115 data centers, and 54 education centers.

Earlier this month, when Maisonrouge explained the restructuring of IBM World Trade Corp., he described the corporation he now heads as, "World Trade Europe/Middle East/Africa—and the Soviet Union. We didn't put it in the name, but it's there." As a matter of fact, IBM sold its first computer to the Soviets in Leningrad in 1972, and last year signed a $10.5-million agreement to automate all Intourist reservation facilities.

IBM has actively sought business in Eastern Europe from its office in Vienna. But the scope of the new corporation is even broader, reaching from Reykjavík, Iceland, to Cape Town, South Africa; from Ireland to Vladivostok on the Sea of Japan.

The European part of the business has come a long way from 1910 when the Deutsche Hollerith Maschinen Gesellschaft was founded in Berlin, a part of Herman Hollerith's Tabulating Machine Co., a predecessor of IBM.

In 1911, with the establishment of the Computing-Tabulating-Recording Company—forerunner of IBM, European representatives were appointed. Eight years later, central offices were established in Paris to handle the European operations of C-T-R.

Between the two World Wars, IBM established sales agents, branches, and subsidiaries in more than 30 countries around the world. After World War II, it was clear that the overseas business had reached only a fraction of its potential. In 1949, the IBM World Trade Corp., was established as a wholly owned subsidiary of the IBM Corporation.

The company began decentralizing its overseas operations in 1957 after revenues had grown from $51-million to $202-million in just six years. Five major geographic areas were set up, each under an area general manager—Europe, Latin America, Asia/Pacific, South Africa, and Canada. In 1972, the forerunners of the newly announced corporations were established—Americas/Far East and Europe/Middle East/Africa.

Maisonrouge returns to Paris this summer to join Frank J. Cummiskey, president of the new corporation. In France, Maisonrouge will be heading IBM Europe, an organization doing business in a highly complex world in which 1,051 languages and dialects are spoken, and where computer applications range from simple accounting machines to vast teleprocessing networks.

Of key concern to the new corporation's top command is global inflation, economic nationalism, and the effects of the oil crisis. Competition is keen—from companies subsidized by their own European governments. For Europe as a whole, economists expect the Gross National Product to grow by less than 1 percent in 1974. But it is expected to get back into high gear the following year.

Americas/Far East

IBM's business in this part of the world dates back to 1917 when International Business Machines Company, Ltd., was established in Canada with 100 people and a punched card plant, succeeding subsidiaries of the Computing-Tabulating-Recording Company. That same year, a C-T-R agent was appointed in Brazil. Today, Canada and Brazil rank second and third, respectively, behind Japan as leading countries in Americas/Far East (AFE), now a corporation of 44 countries and some 35,000 IBMers.

The new corporation covers a sales territory of close to 18 million square miles. Nearly one-third of the world's land surface, the area includes Canada, Central and South America, Australia, New Zealand, and all the countries of the Far East.

IBM Senior Vice President Ralph A. Pfeiffer, Jr., the new chairman and chief executive officer of Americas/Far East Corp., views his new world as "extremely exciting."

At the recent announcement meeting, Pfeiffer—former president of the

Data Processing Division—told World Trade management: "During 1970 and 1971, when we were having a tough time in the United States, you contributed mightily to the corporation. And you made IBM a household word throughout the world."

Gordon R. Williamson, AFE Corp. president and a man with extensive World Trade experience in Tokyo, New York, and Paris, has been investigating the possibility of extending IBM business into the People's Republic of China as well.

AFE has a total of 152 sales locations around the globe. In addition, there are four office products plants—Don Mills, Canada; Bogota, Colombia; Sumaré, Brazil; and Mexico City.

There are seven data processing equipment plants—Buenos Aires, Argentina; Sumaré, Brazil; Bromont and Don Mills in Canada; Bombay, India; Fujisawa and Yasu in Japan; and two development engineering laboratories —Don Mills and Fujisawa.

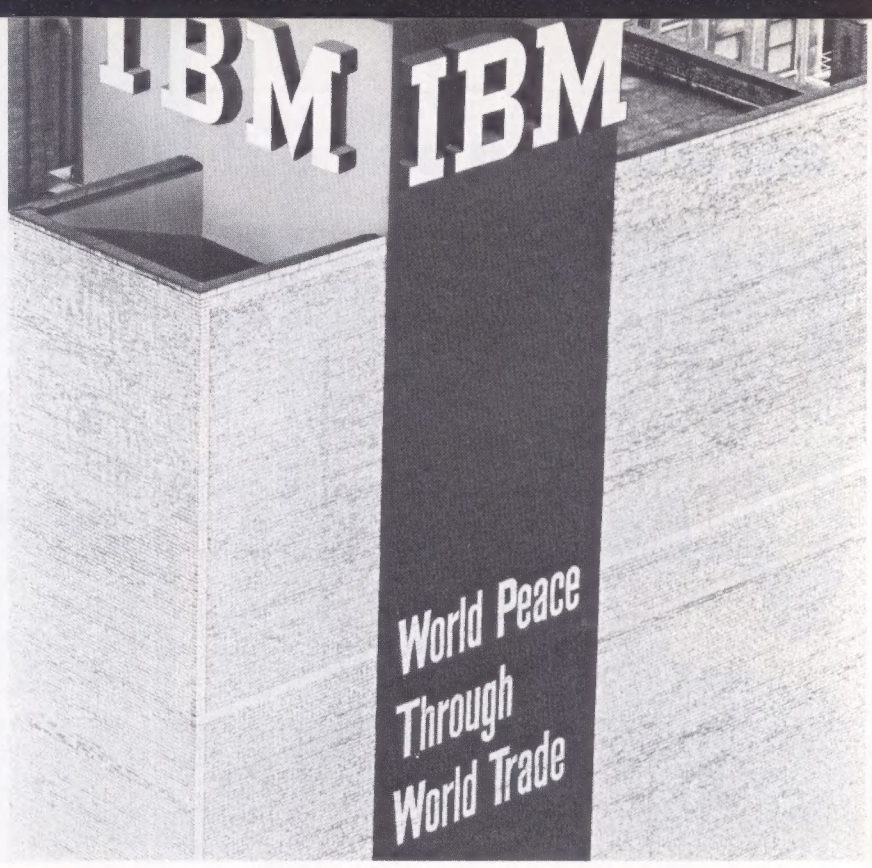
The number one country—Japan—has been a leader in sophisticated data processing applications, including a world famous computer-based information network at NHK for television programming, scheduling, and monitoring. Brazil has also achieved remarkable growth, including such advanced data processing applications as a recently installed System/370 Model 145 to keep track of legislation in the national senate.

Headquarters for AFE will be in Port Chester and White Plains, N.Y., pending occupation of its new building in Mt. Pleasant, N.Y.

Among the key concerns for AFE—as for its counterpart corporation in Europe—are tough competition, economic nationalism, the fuel crisis, and global inflation.

Still, the markets for data processing and office products equipment are a long way from being fully tapped.

After a lull in the economic cycle during 1974 and 1975, economists predict a strong recovery for the second half of the Seventies. ■



It began with a voyage

Thomas John Watson Sr., was a man convinced that the company he headed would fulfill its destiny only as a worldwide corporation.

A reading of contemporary business writings about the earliest years of IBM and its tiny predecessor companies leads to the conclusion that Watson's vision was far ahead of its time.

Watson never forgot his primary objective: to make IBM first in its field in America. But it is equally clear that he never lost sight of the immense business potential of the rest of the world. And of the powerful force for peace that exists within international trade.

The origins of IBM's involvement in international trade go back to the end of the first World War. It was September 1919, when Watson, then president of the Computing-Tabulating-Recording Company, sailed for Europe on the *S.S. Rotterdam.* With him were George W. Fairchild, C-T-R's chairman, and Samuel M. Hastings, president of the Computing Scale Company of America.

Europe, exhausted after nearly five years of war, was near bankruptcy. But Watson was about to embark on a tour of France, Germany, Holland, Belgium, Spain, and Switzerland to assess the business he sensed waited there. With him would be Robert L. Houston, general manager of the Tabulating Machine Company, who had preceded him to Europe, and Andrew Jennings, a pioneer in punched card equipment.

The company's publication, prophetically named *International Business Machines,* commented on the sailing in the unabashed rhetoric of the day — but, as it turned out, with a good deal of foresight: "We have waited long and wearily for the opportunities which . . . are opening . . . in foreign markets . . . This is the psychological hour to strike with all the force we can muster and develop the vast possibilities of Foreign Trade awaiting us . . .

"Our faith in our products, in ourselves, and in the promise of business at home and abroad were never so thoroughly fixed as now," it concluded. "We must impress upon the world the necessity of [our products] in the mastery of business. That our executives will carry this message . . . and that they will return in the full glory of these accomplishments is our prophesy."

Prophetic, perhaps, but premature. It still would be many years before IBM really moved into the world market.

The name "International Business Machines" was first used in Canada, in 1917. Watson was photographed in front of a Toronto storefront, an oversized sign proudly proclaiming the oversized name. Later the same year, the company named an agent in Brazil. And in 1919, Watson took his bold trip to Europe.

During the 1920s, IBM's business in Canada and abroad grew steadily. The Société Internationale des Machines Commerciales, in Paris, sold IBM equipment throughout Europe.

The slogan "World Peace through World Trade" became synonymous with IBM after Watson's famous 1937 speech to the International Chamber of Commerce.

The end of the war, and the creation of the United Nations, rekindled Watson's hopes. He was in his seventies, an age when most men are in retirement. Yet Watson led his company into vastly expanded world trade, culminating in 1949 with the establishment of the World Trade Corporation.

That first year, 1950, the new IBM World Trade Corporation was doing business in 65 countries. By the end of the decade, it had broadened its operations to more than 100 nations.

Arthur K. (Dick) Watson who was to become the "Mr. World Trade" of IBM, was elected vice president and general manager of the worldwide operation in 1952. He became president in 1954. Under his guidance, WTC's rate of growth was so rapid that by 1957 it was clear organizational changes were needed. Watson announced decentralization of overseas operations that year into five geographical areas: Europe, Latin American, Asia/Pacific, South Africa, and Canada, each under an area general manager. Later Australia/New Zealand, and India/Ceylon were added.

Fortune Magazine, in a 1960 article about Dick Watson's leadership of World Trade, was prophetically optimistic about WTC's growth possibilities: "If it . . . maintains its present growth rate . . ." *Fortune* predicted, "it is only a matter of time—though perhaps a fairly long time—before World Trade becomes the bigger half of the enterprise."

Although the Sixties didn't quite bring World Trade to that level, it was a decade of vastly expanded business, of new plant construction overseas, of widespread expansion of customer uses for computers.

By the end of 1974, under the chairmanship of Watson's successor, Gilbert E. Jones, IBM World Trade was manufacturing data processing and office products in 41 equipment plants in 14 countries. Another 57 facilities were turning out information records products such as punched cards, paper documents, and magnetic tapes.

Today, the overseas operation has some 122,000 employees throughout the world. A far cry from that September day in 1919. ■

New man at the top in DPD

"We have a really good thing going. We are off to a fine start. The single-staff concept is sound, is working, and is paying dividends."

The speaker: new Data Processing Division President John F. Akers. The subject: DPD's start-of-the-year reorganization into 14 regions reporting to two vice presidents at divisional headquarters.

Akers was one of those vice presidents. Now, a few months later, Akers is head of the entire marketing division that is moving into the mid-1970s with the momentum of two good selling years behind it.

The ascent of Akers, who joined the company in 1960 after Yale and a hitch as a Navy flier, has been rapid.

A colleague, who worked closely with him when Akers was head of the New York Media branch, says that DPD's new president has all the qualities one expects in an IBM executive: business knowledge, the ability to get things done, decisiveness—and something extra. That something is a rare ability to relate to people at all levels.

As New York Media branch manager in 1969, Akers led his office to an outstanding year and the President's Plaque, awarded annually for the best overall sales performance of a "very large branch." Before coming to New York, Akers had been a salesman (he joined the company in California), a district marketing rep, a marketing manager, and an assistant district manager.

He left the field for a tour of duty as an assistant in the office of IBM's president, returned to DPD as industry director, distribution/media, and was there during the months preceding the announcement of IBM's retail and supermarket point-of-sale terminals.

The next stop for Akers, who is 39, was DPD's Western Region where, as vice president and regional manager, he oversaw an extremely successful selling and installing year in 1973. Then, as part of the division's reorganization, he became vice president, field operations. He was just settling into that new job when he was asked to serve as DPD president. ■

Four years ago it was overtaken by System/370, but in its heyday there was nothing like it.

For 14 years, the infant computer industry had been stunning the world with its technological surprises. But there had never been one like this.

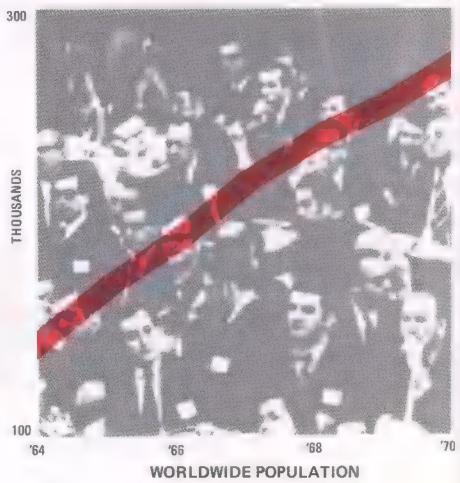
At two minutes after 11 on an overcast Tuesday morning, April 7th, ten years ago, IBM Chairman Tom Watson, Jr., made the announcement that the *Dallas Morning News* called "an announcement heard 'round the world."

It was System/360, code-named NPL—for new product line—during its years of gestation. The new name (it would be imitated) had been inspired by the compass.

Watson, a man seldom given to superlatives, called it "the most important announcement IBM has ever made." And, certainly, it was the biggest, boldest, most ambitious product move the company had attempted.

Even the generally staid *New York Times* called it a "giant step." And most industry observers agreed. System/360 not only overtook two whole generations of equipment, but it also represented a multibillion dollar changeover that some say changed the entire concept of computers forever.

During its six-year product cycle, until it was superseded by the more advanced System/370 in 1970, System/360 called for a substantial capital investment. So prodigious was the undertaking that IBM found it necessary to go into the equity market in 1966 to raise an additional $371.6-million. In addition, in 1967, IBM had to raise approximately $200-million more



IBM System 360

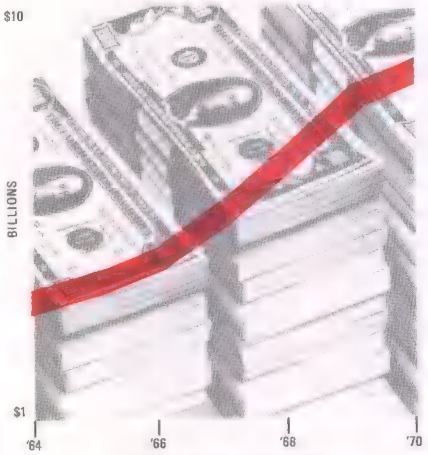
TEN YEA

through short-term loans.

With System/360, IBM moved into the front rank of American corporations.

The company went from $3.2-billion in gross income in 1964 to $7.5-billion in 1970, going from ninth to fifth place on the *Fortune* list of 500.

At the time of announcement, IBM's worldwide employee population stood at about 140,000. By December 31, 1970, it had risen to about 269,000 people. ■



WORLDWIDE REVENUE

Press comment

For a major product, a major press conference. That's exactly what IBM arranged for the introduction of System/360. A special train left New York's Grand Central Station at 8:30 a.m., the morning of April 7, 1964, carrying members of the press north to Poughkeepsie for the big event.

A leading Texas daily summed up the event in an editorial later that week. "As business announcements go," said the *Dallas Morning News,* "it was one of the biggest . . . But even more important, the IBM announcement was a supreme and astute public relations effort —fully on a par with the usual high standard people have come to expect from IBM."

These are some other comments that appeared in the press:

"Here's a corporation at the top of its own particular heap. Somewhere within the organization are men with the foresight and vigor to try and keep it there. We refer of course to the announcement yesterday of a 'new generation' of IBM electronic data processing equipment."

Binghamton Press

"If there are a few secluded individuals who haven't yet realized the present and potential impact of the computer on the nation's business life, the steps taken this week by IBM should help to shake them awake."

United Press International

"Humility comes easily in the face of many of today's engineering and scientific achievements. But it's hard to imagine a more uncomfortably humbling experience than to eye-witness the launching of a new computer system like the IBM System/360 . . ."

Los Angeles Times

"The Davids slung stones Tuesday at the Goliath of the computer industry and its claim that it is about to 'change the entire concept of computers.' Twin Cities competitors of IBM downgraded the asserted revolutionary aspects of System/360, introduced yesterday with considerable fanfare."

Minneapolis Morning Tribune

"Computers may be as much a part of everyday life by the end of the 1960s as cars, crabgrass and cash registers are today. This is not the prediction of a researcher, but practical commercial fact as IBM announced the new System/360 line . . ."

Oklahoma City News

"The company famous for the slogan 'think' has developed a new computer system that should relieve man of much of his routine burdensome thinking."

San Francisco News Call Bulletin

"Well, it had to happen one day. A computer that makes computers obsolete."

Seattle Post-Intelligencer

"A giant stride into the field of advanced electronics was announced this week by IBM."

Toledo Monitor

"Mr. Watson was asked what impact the new system would have on competition. He replied with characteristic understatement, 'It places us in a very good relationship with our competitors.' "

The Wall Street Journal

ARS AGO

MORE MORE MORE

How oil and coal producers are using computers to get more out of the ground.

SELF-SUFFICIENCY

The Middle East oil embargo may have ended but the memory of that trauma lingers on. Never had the prospering industrial nations been as bluntly reminded of how dependent they have become upon energy imports.

For most countries, the notion of self-sufficiency in energy resources remains an impossible dream—one which must await the coming of fusion. But fusion, or the generation of electric power from the hydrogen found in ordinary water, is still—as the scientists like to say—X years away.

For the United States, however, some say that self-sufficiency in the interval between now and fusion may be possible. For the U.S. is a major oil producer; it produces 70 percent of its daily needs. And half the world's known supply of coal lies under its crust—four times more energy than the Middle East has in oil.

The articles in this section are the work of Pulitzer Prize-winning author, William Longgood. A frequent contributor to national magazines, the author of several books, he makes his home on Cape Cod, where he spends his own energy resources jogging the chill morning beaches between assignments.

In the U.S., the Federal Energy Office has proposed what it calls *Project Independence.* It is an ambitious program for achieving energy dependence in the early 1980s. It would do this by stepping up the rate of growth in domestic energy production, and by cutting back—through conservation—the rate of growth in demand.

The program, among other things, calls for an expansion of coal production from 600 to 960 million tons per year, the expansion of oil production from 10.9 to 14 million barrels a day, a tenfold increase in nuclear power, the expansion of natural gas production.

Whether or not it makes economic sense is an issue of some dispute. Estimates are that it would cost $98-billion just to subsidize new synthetic fuel industries over the next fourteen years. Moreover, an economist associated with the respected Brookings Institution puts the cost of U.S. energy self-sufficiency over the next 20 years at $985-billion—or almost a third of a *trillion* dollars more than the estimated $663-billion cost of imported oil during that period.

Proponents argue that, whatever the cost, the U. S.

Drawing by Niculae Asciu; © 1974 The New Yorker Magazine, Inc.

cannot risk dependence upon overseas sources which could be arbitrarily shut off. Opponents favor a stockpiling program with a four-year supply of oil in tanks—enough, they say, to weather almost any interruption and at a substantially lower cost. Even the name has drawn fire. *Project Independence,* its critics say, could lead to estrangement, possibly, even, to political and economic isolation for the U.S.

But whatever course the U.S. takes, one thing is clear—those rising Persian Gulf prices have given new incentives to U.S. oil and coal producers. With cheap imports gone, possibly forever, domestic oil producers are drilling new higher-cost wells. Coal producers are finding new markets for their tonnage.

Thus at a time when the country is demanding more, computers are helping to produce more. In oil exploration, they are easing the awesome risks of drilling. In refineries, they are wringing more product out of every barrel of crude. And, in both underground mining and strip mining, computers are helping coal operators to increase their yields and hold down costs.

For a look, then, at what computers are doing to help oil and coal producers get more out of the ground, this special section of *Think.*

How to avoid those dry holes

Computers can't take the risk out of drilling for oil. But they sure can better the odds.

Every viewer of late late TV movies knows that a wildcat oil well is brought in with a roar and a gushing of oil that pours down in a black torrent. Clark Gable, khaki-clad and oil-drenched under a derrick, throws back his head, arms extended, to cry triumphantly, "We've struck black gold."

That's vintage Hollywood. Today, wildcat oil is legend. The oil business is so highly automated that petroleum is rarely, if ever, seen—from the time it leaves the wellhead until it enters the gas tank. There is no dramatic gusher. Not only very dangerous to man and equipment, but too much pollution and waste.

Fuel is so scarce, so vital, and the costs so great that there is little room for guesswork or waste. In this perilous balance, the computer is being used increasingly at every step of the way in exploring for, producing, transporting, refining, and allocating oil.

Even with the most exacting science available, the odds are overwhelmingly against finding a rich oil well. Of every nine wells drilled, only one produces any oil at all. Only one out of many more produces commercially significant amounts. The cost of drilling a single well—whether it turns out to be a dry hole or a rich strike—ranges from about $100,000 to more than $3-million. And it may take a year, with crews working around the clock.

With the demand for petroleum rising steadily, the problem of supplying the energy-hungry U.S. becomes progressively difficult.

"All the easy finds are long gone," says one industry executive. "As reserves diminish, it is necessary to drill deeper and develop more sophisticated techniques to uncover petroleum supplies that were previously overlooked, unavailable, or not fully exploited."

Today's wildcatter must be more than an optimist or gambler; he must be a sleuth as well. A geophysicist, to be exact, and a cross between Sherlock Holmes and James Bond. In this highly sophisticated hunt, one of his basic tools is the computer.

IBM has been a leader in developing computer equipment and programs to help the industry in its search. In Houston, often called the oil capital of the world, IBM maintains the International Petroleum Exploration Center, composed of IBMers—both from the U.S. and abroad—who specialize in applying computers to petroleum exploration. The staff includes professional geologists and geophysicists. The center's main functions are to find ways to help the petroleum industry manage enormous amounts of data through storage, retrieval, analysis, and display; and, through a highly sophisticated process known as seismic data reduction, to help determine if there is oil underground before going to the expense of drilling.

To understand the computer's key role, it is necessary to understand the nature of oil reserves. Scientists generally agree that oil began to form on ancient seabeds some hundreds of millions of years ago from the remains of creatures and plants. Droplets of oil, carried along by seawater, were captured in porous rocks by accumulating sedimentary deposits above. This oil-bearing seawater (along with gas) migrated along porous rock passages until it was blocked by some barrier, usually impervious rock. Because oil is lighter than the salt water, it filled the upper portion of the trap or reservoir. Contrary to popular belief, oil is not found in pools, or underground seas, but fills porous rock formations.

The oil explorer normally does not look for petroleum itself, but for the structures where it may exist. In the early days, oil was easily located due to surface irregularities; often these were buried salt domes that created a surface bulge. Such obvious petroleum sources were quickly recognized and developed. Geologists had to find ways to pinpoint reserves that could not be recognized by surface features. At first, they used tools that measured variations in the earth's magnetic field or the gravitational pull of rocks miles below the earth's surface. About 50 years ago, a new technique used seismic waves to draw a vertical cross section of underground features—a major breakthrough in oil exploration.

Early seismic methods were primitive by today's standards. A series of explosions (usually dynamite) were set off, and the velocity of the sound waves was measured by sensors stretched along the ground. (The amount of time required for a seismic wave to bounce back from the various strata gives a clue to the depth of each rock layer.) A man with a "paper record" analyzed the findings and drew a crude seismic cross section. It provided a profile of subsurface irregularities where oil and gas might be found.

Today, this technique has been highly refined. In promising locations, detailed seismic studies are made by introducing sound into the earth (often with a vibrator or some ground-thumping mechanical device) and capturing the reflected energy waves with detectors called geophones. The geophones—strung out in long lines over the survey area—are so sensitive that they can detect a strong wind or a man's footsteps a quarter-mile away.

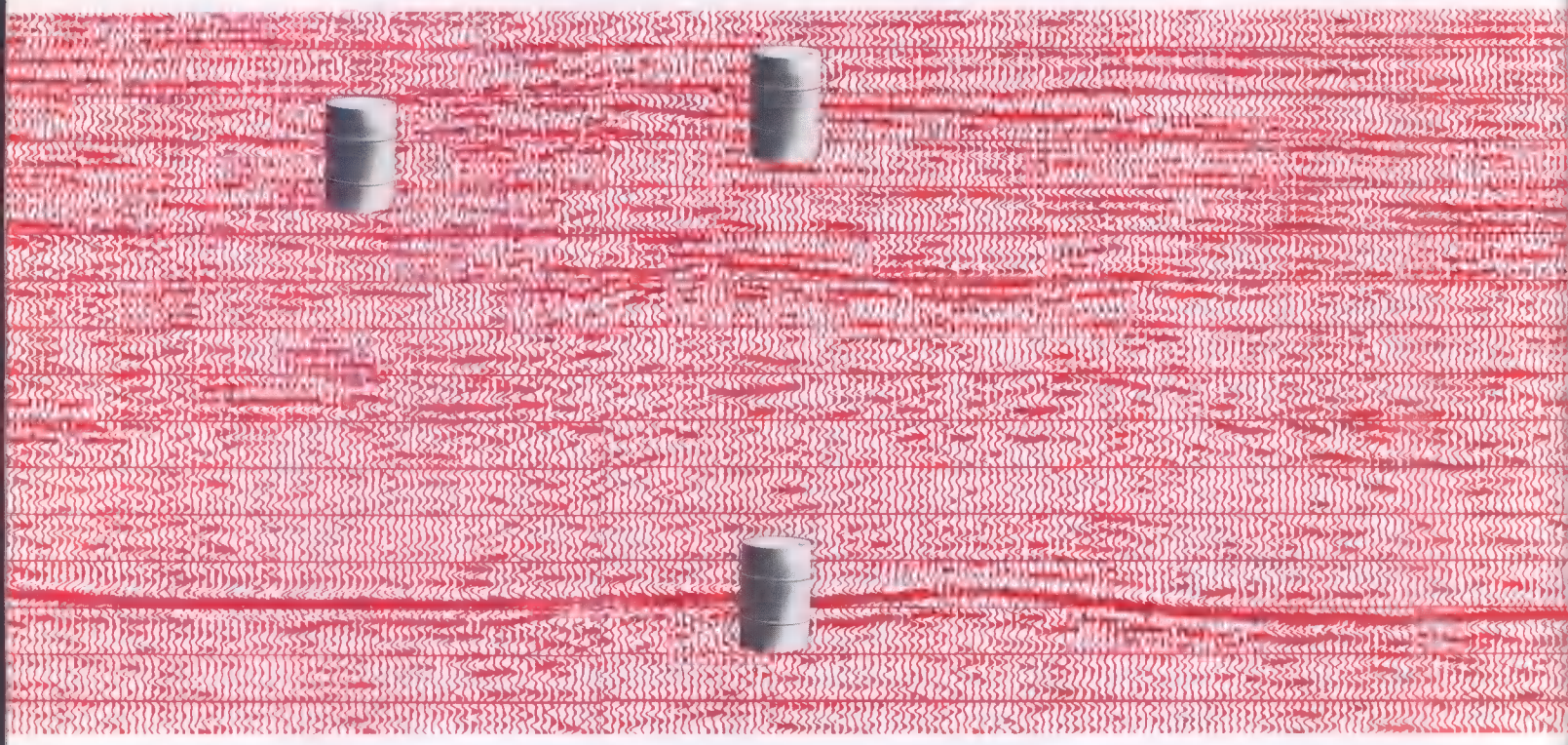
A modern seismic cross section is a fantastic maze of squiggles made up of hundreds of thousands of readings. A dozen or more miles of recordings can be compressed into a map only a few inches wide. To produce this cross section is a large task involving computations that can be done only by a computer.

The seismic data must be reduced—by computer—to eliminate the "noise" (unwanted signals) that obscures the hidden design of subsurface features. This elimination allows the geophysicist to use his experience and ingenuity

The cutting edge of an oil well—the spot where a combination of work, computer technology, investment, and luck may pay off in discovery of a rich lode of oil. These oil workers are setting up a drilling rig which can bore four miles straight down in the search for new oil fields.

'What the public doesn't understand is that oil isn't so easy to discover. You put a million bucks into a hole and it's dry. You've blown it and you're back selling hot dogs.'

Anthony Reso, Houston geologist
from *The New York Times*



An IBM *computer may have to perform millions of calculations to produce a "roadmap" such as this (supplied by Western Geophysical Company), which points to locations deep underground that may hold oil. Often, "bright spots" or wide dark lines such as the one on this seismic chart may indicate the location of new oil fields. These charts result from computer analysis of seismic, or shock, waves, which are read by instruments so sensitive that they can record a man's footsteps a quarter-mile distant.*

to uncover the earth's secrets and pinpoint potential petroleum deposits.

The petroleum industry today spends a billion dollars a year gathering seismic data and storing it in digital form.

"The number of operations in reducing seismic data is so enormous that millions does not describe it," says Dr. David Crane, manager of the IBM center in Houston. "They would overwhelm all but the largest computers." IBM, working with some of its petroleum customers, invented a device that can efficiently handle long strings of numbers. It enables slower and smaller computers to do large-scale seismic operations. The device is called the IBM 2938 floating point array processor.

Refinements in computer techniques are continually taking place—enabling engineers to find subtle deposits, on land and offshore, that otherwise would have eluded them.

All oil exploration men emphasize, however, that the best of data merely points to the possibility that reserves exist. The only real test is to drill a well —at 50-to-1 odds against a significant strike.

The computer helps cut the odds by precisely aiming a drill into the ground. Harold Sherrod, explorations systems coordinator for the Amoco Production Company, Houston division, recalls that 11 years ago the computer was used only in the corporation's accounting functions. In 1962, he was asked to apply computers to exploration. Today, he says, the computer is indispensable.

Sherrod and W. L. (Bill) Adams, manager for exploration for Amoco in Houston, say their IBM equipment handles old jobs faster and new jobs in computation that would be impossible by hand. The Houston division has access to two IBM System/370 Model 165s, a Model 145, and an 1800.

In Adams' office, the two men enthusiastically spread seismic and gravity maps on a desk, explaining that they represent recently leased offshore properties in the nearby Gulf of Mexico. "Here's the raw data," says Sherrod, pointing to a sea of squiggles. "They must be refined to find out what they mean. That's where the computer comes in." The maps are automatically plotted, adds Adams. "It would take forever to do it manually."

Such computer techniques have opened new reservoirs of oil. For 40 years, Adams explains, "oil was extracted from southern Michigan. Then geologists said, 'Why not the north?' But as we went north, our old tools became useless. No one found any-

thing. A sophisticated combination of proper field recording techniques, computer processing, and interpretation were the key to opening important new reserves in northern Michigan."

Today, the name of the game in the oil business, say Adams and Sherrod, is in applying new computer techniques and technology. The first oil well in the world was drilled near Titusville, Pa., in 1859, to a depth of 69 feet. In the 1920s and '30s, exploration in Appalachia was extended to 6,000 feet where new reserves were found. "Now the industry is looking for production at 20,000 feet," says Sherrod.

Because oil and gas may turn up in unexpected places, oil companies keep tremendous files of geological data on oil wells that have been drilled.

"All information relevant to a well," notes Adams, "goes into the computer: rock information, pressure information, test-bore information, production statistics, and others, and every time we want to use it, we massage that information with the computer.

"We're in the Appalachian Basin now. If we didn't have that information in the files—what happened in the past—we'd be lost."

Not only does the computer largely determine the positioning of wells, but it also governs much of the actual drilling operation. Amoco has developed what it calls "Op Drilling," an "optimized" program designed to save money through reduced drilling and increased efficiency. It also contributes to safety and environmental protection. The computer selects the most efficient and economical combinations of such drilling variables as the particular mud program (a mixture of water, clay, and chemicals that clean and cool the drilling bit and carry cuttings to the surface), a balanced hydraulics program, optimum bit weight, rotary speed, and the type of bit to be used for the particular formation drilled.

Lloyd Elkins, director of production research for Amoco, estimates that costs on optimized wells are running from 15 to 20 percent below what they would be without the program. Elkins explains that it would take 20 noncomputerized wells to obtain the same amount of information and expertise as the first or second well with Op Drilling.

Once oil is discovered, the computer moves to the next step, production. It determines the amount of reserves, the most efficient way to remove them without damaging the field—the number of wells, their distance apart, extraction rate and method. The computer also regulates the separation of oil, gas, and water, measures the flow, keeps vigil over daily operations, regulates some of the most complex pipeline operations, and performs heroic accounting tasks.

One of the most complex jobs in the management of oil fields is keeping track of royalties. Usually a field is leased rather than owned outright by a petroleum company, or the company merely buys mineral rights without owning the surface. Generally, the owner of the minerals under a leased property gets one-eighth of the production, and the company gets the remainder.

Mineral ownership can entail enormously complicated bookkeeping to pay royalties to owners, heirs, myriads of relatives and legacies.

All of these various functions are performed by computers at Amoco's Hastings Field, about 20 miles south of Houston. One of the better fields in the U.S., it consists of approximately 14 square miles of flat prairie land. But look for the traditional forest of derricks and unsightly storage drums and you won't see them. Texas Highway 35, between Houston and Alvin, cuts through the area. On both sides are brush, wild flowers, and grazing cattle. A few years ago several hundred huge storage tanks were removed because computers made it possible to regulate an even flow of oil directly to the refinery—without the necessity of storing it. Now, the only indication of oil wells is an occasional "Christmas tree"—a stubby, exotic arrangement of valves and special connections—data collection points, separators (where oil is separated from water and gas), a gas-processing plant, a few pipelines, and the low administration building.

The field has been under computer control since 1971. By 1975, Amoco expects to have about 65 percent of its entire daily production in the U.S. and Canada under computer control. A central computer is linked to remote terminal units at various locations throughout the field. If a piece of equipment malfunctions, the information is transmitted to the computer and printed out for the system operator. He notifies the appropriate field personnel, and corrections are made.

At Hastings Field, 460 wells are linked to an IBM 1800. The computer helps determine the most efficient rate of withdrawal. If oil is extracted too fast, a field can be ruined for many years or even permanently.

Computers have many champions at Hastings. Curtis Ferguson, administrative assistant, says: "We're here to produce oil, and the computer helps us to produce it faster and safer." Ferguson explains that, in the past, a well might not produce its allowable amount, and this fact wouldn't be caught in time to make up the shortage for the month. The Texas Railroad Commission, which regulates petroleum in the state, wouldn't let the shortage be made up later. The result: underproduction and financial loss. Now, the computer monitors well-performance almost minute by minute. The slightest departure from normal flow is caught quickly—even subtleties that previously might have been overlooked—and corrected. There is less loss in production.

"This permits us to operate our oilfields more efficiently, and to make more oil per month," says Ferguson.

Oil men often make the point that the best exploration techniques and production methods are wasted without leases for land to drill on. Henry Meyer, director of management science for Pennzoil Company, says the computer has become a "powerful instrument" in providing the economic information on which leases are bought. POGO (Pennzoil Offshore Gas Operations) was formed in 1970 and has spent about $250-million on offshore leases in the Gulf of Mexico. By using a computer-generated financial model, Meyer says, the company was able to predict "with reasonable accuracy" what the leases would cost. "The computer, a System/370 Model 155, was used to help determine policy and optimize strategy."

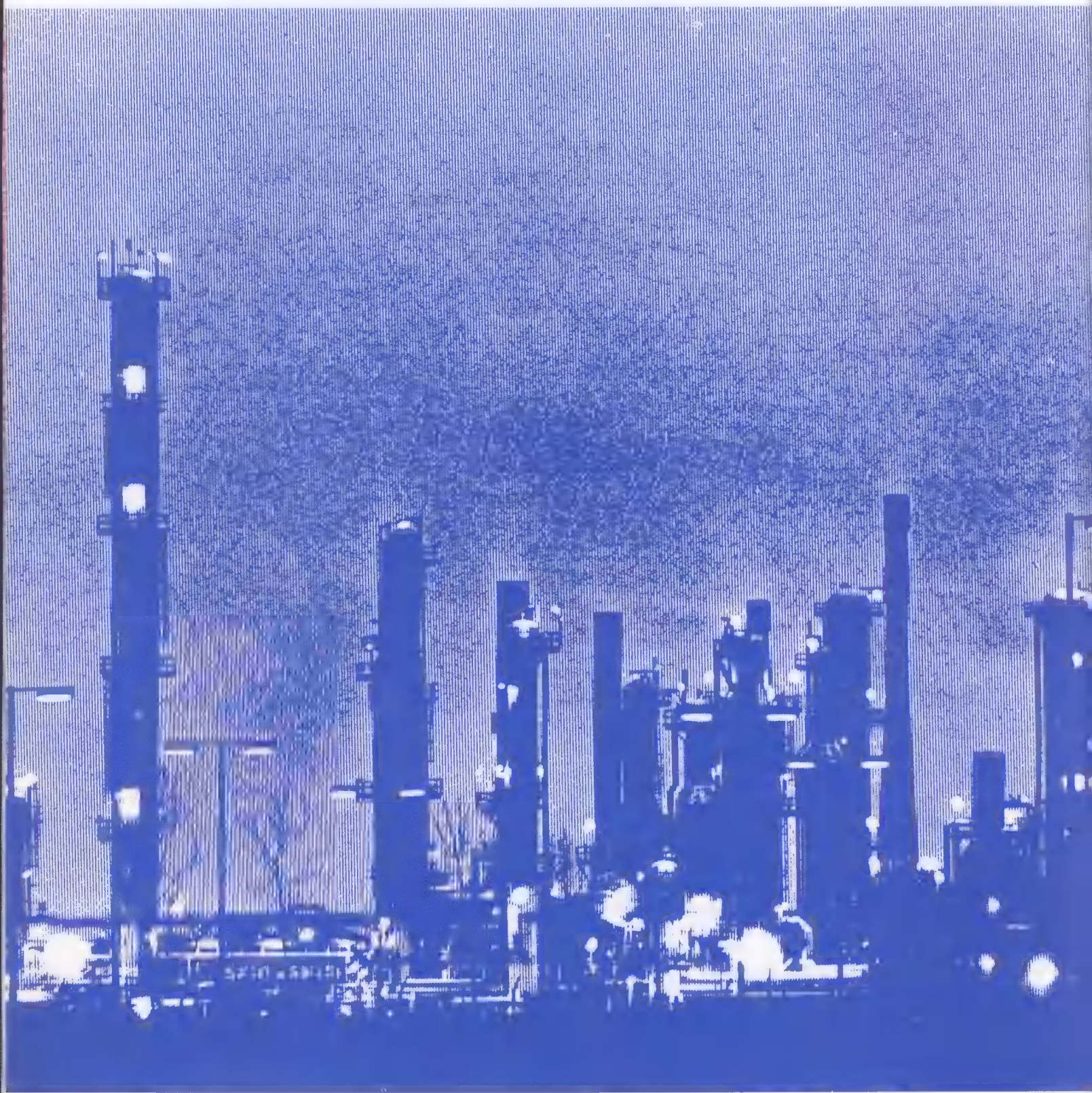
Computers don't make energy, but they make it available, says Meyer, by locating reserves and by helping with economic studies.

"With this information," he says, "we can present a fair, balanced picture to the investor—the guy who puts up the money. And we must have the money to carry on . . ."

Meyer is enthusiastic about planning models that incorporate every known factor, "real or imagined," to help management make intelligent decisions and project future courses of action. ■

Getting the most from a barrel of crude

That's the role of a modern oil refinery like Mobil's in Joliet. IBM computers help.



"Joliet may be the most closely monitored refinery ever built," said a leading petroleum trade journal of this Mobil Oil Corporation refinery in Illinois. IBM *computers make it possible to keep track of every barrel of oil, gasoline, and other distillates produced at the big refinery, which currently is processing some 175,000 barrels of crude oil daily.*

One of the newest and most effective of the 264 refineries operating in the United States today is Mobil's plant in Joliet, Ill., 45 miles south of Chicago. As you approach from Interstate Highway 55, your first glimpse is of four spidery derrick-like towers that rise out of the flat Midwestern prairie. Drawing closer, you see an intricate web of pipes, towers, and storage facilities, some of the latter huge drums and others white spheres that look like fat space ships poised to take off.

A visitor described the Mobil refinery as looking like "a lot of plumbing." But to engineers it is a marvel of efficiency. Every day, around the clock and around the calendar (including Sundays and holidays), the refinery can turn 175,000 barrels of crude oil into usable gasoline, heating fuels, and other petroleum products.

It receives oil from pipelines that reach into Canada and West Texas. Two-thirds of the finished product is sent by pipeline into the eight-state market around the refinery, and the rest is shipped by barge to St. Louis for delivery by rail and truck.

An integral part of the refinery: a pair of IBM computers which keep track of thousands of highly complex procedures and feed the right information at the right time to operating personnel and management.

"The computers don't make gasoline or heating fuel," says an engineer at the Joliet refinery. "But they help make sure that every gallon of crude that comes into this place is used as efficiently and as creatively as possible."

A refinery is, primarily, the processing unit in a pipeline between the oil-producing field, or shipping terminal, and the user. Its basic function is to convert crude oil into usable products. Crude comes to the refinery as a mixture of thousands of different hydrocarbons—compounds of carbon and hydrogen. Mixtures vary from one producing field to another, and the assortment and proportion of hydrocarbons determine a mixture's particular character and type.

It is the function of the petroleum chemist to juggle and rearrange the number of crude oil atoms to make new combinations to form new products. Says the American Petroleum Institute: "The refining process performs on a large scale what the chemist has already done in the laboratory. By a series of processes, crude oil is separated into various hydrocarbon groups, which are combined or broken up, and perhaps other ingredients added."

By manipulating the petroleum molecule, refineries have developed or provided the materials for a wide range of products used in industry today. Among the earlier products developed by altering the carbon-hydrogen atoms in refinery gasses, beginning in the 1920s, were ethylene, propylene, and a type of alcohol. Since World War II petrochemicals have boomed into a major industry. About 3,000 different chemicals are now manufactured wholly or in part from petroleum and natural gas. More than 600 petrochemical plants produce over 131 billion pounds of chemicals from petroleum.

Mobil's Joliet refinery was designed with a view to producing the most valuable petroleum fractions. Its major products are liquified propane gas (LPG), gasoline, jet fuel, diesel fuel, kerosene, and heating oil. The plant's eight processing units keep squeezing out the maximum of these products from each barrel of crude. Finally, all that's left is the coke. Each day the refinery produces 1,700 tons of coke, which is stored in a huge pile until barged off and either burned by utilities to produce electric energy, or sold to industry for raw material or fuel. Another by-product is sulfur. Three

Top: Computer control of complex chemical and heating processes ensures the highest possible output of distillates, while minimizing production costs. Mobil's experience with the vital IBM *1800 computers has been that their reliability is "very high—99 percent plus."*

These futuristic domes store distillates which feed America's industrial and transportation appetites—diesel and jet fuels, propane gas, gasoline, kerosene, and heating oils.

hundred tons are recovered daily, stored in an underground tank, and sold to industry.

"We take out everything but the squeal," says Lee Wolfer, manager of the Joliet refinery's process computer department, borrowing an old line about the fate of pigs in a packing plant.

The refinery has flexibility in meeting seasonal product requirements, Wolfer explains, so it can maximize gasoline or distillate. This is controlled by modifying the steps in the refining process.

Wolfer is dedicated to the refinery, possibly because he has been with it virtually from its inception. He was one of a team of Mobil computer experts picked from plants throughout the U.S. to set up computer operations when construction began in 1969.

During construction the computer team worked in a small office in Joliet. Their assignment was twofold: 1) to install a management information system that would encompass about 90 percent of the refinery's operations, and to have it in operation when the plant went on-line in 24 months; 2) to start work on adding a computer control system after the information system was in operation.

This marked a dramatic advance in refinery automation for Mobil, and made the plant one of the nation's most modern refineries. The *Oil and Gas Journal* of April 1973 stated that "Joliet may be the most closely monitored refinery ever built."

When picked for the Joliet project, Wolfer was supervisor of computer applications at the company's refinery at Paulsboro, N. J., near Philadelphia. That installation used an IBM 1800 process control system that was concerned with just one process. For him the new assignment was "exciting from the standpoint that you knew you'd be able to generate information not previously attempted in the company—to see the big picture. People using the information would be able to comprehend the total operation and not just one or two segments."

Most other members of the computer task force, like Wolfer, had used IBM equipment. After extensive study of their mandate, its demands, and the equipment available, the group recommended buying from IBM. Two IBM 1800s were installed. The system software was designed by IBM; the application written by Mobil.

How has it worked out?

Says Wolfer: "It has achieved the objectives we established. From the energy standpoint, the computer pro-

vides the necessary information to management to insure the maximum yield of gasoline and distillate."

His enthusiasm is echoed by his boss, Robert Woodham, manager of the technical department, who says: "The system gives us a wealth of information for all sorts of uses." Woodham's last assignment was in a Mobil Chemical Company unit where operations were reported manually. "Once we knew a piece of equipment was performing badly, we had to send an engineer to analyze the problem and recommend changes. Often it took days. You didn't have a chance at rapid responses. Here trouble can be detected and corrected rapidly."

An example: Joliet must burn large amounts of fuel to get maximum product yields from its crude. The computer monitors the performance of energy-consuming units so the energy is used in the most efficient manner. "If checked only once a week, it could get out of balance and waste fuel," says Woodham. "The computer helps prevent such losses."

The computer's most important function, according to Wolfer, is to keep the refinery on target in meeting its goals. With the information system, management can see each morning how the individual process units and the entire refinery performed during the previous 24 hours.

"In effect the computer double-checks our operations every moment," explains Wolfer. "It is saying, 'This is the production level of the refinery, and this is what it is supposed to be.' If they are not equal, the computer pinpoints where the problem is. Otherwise there would be a loss. A person without information may not know he is not making specifications. The computer continually gives us this information so we always know exactly where we are."

The nerve center of the system is the central control room, located in a one-story building with a front of striking terra-cotta ceramic tiles and blue doors. Near the center of the oblong room are two computer consoles and printers, and display stations.

If, for example, an operator wants to know how the crude processing unit is operating with respect to plan, he simply goes to the nearest terminal and requests the unit performance. The critical crude-unit variables are displayed at once so the operator can see how he is actually doing with respect to target.

Over 1,200 process inputs are fed into the computer from data gathering points throughout the refinery. Included are things such as temperature, flow, pressure, tankage levels, analyses, water treating, and gasoline blending. These are scanned every five minutes, giving the immediate status of the various units. If a process variable goes outside the accepted range, a warning light flashes. A button is pushed to determine if it is a high or low alarm, and corrective action is taken.

One of the IBM 1800s gathers all of the process information, converts the raw data to engineering values, organizes it and passes it along to the second computer. The latter makes detailed engineering studies and performance calculations, and interprets and refines the data into useful information.

Wolfer notes that the reliability of the 1800s is "very high—99 percent plus. This means less than eight hours of downtime out of 720 hours a month. It is one of the reasons for our confidence in IBM, one of the reasons why we took the system.

"It's a very versatile system," he adds. He goes to one of the terminals to demonstrate its capabilities: "You want to know how much fuel oil ran through the CHD (catalytic hydrodesulfurizer)?" He taps the keys and the information is flashed instantly. "The production of number-two fuel oil last month? How is the catalytic reformer working with respect to target? The quality of propane over the last two hours?"

As fast as he poses the questions, the answers appear on the terminal's TV-like screen.

If anything malfunctions, he says, the computer is programmed to scan the entire refinery operation, accumulate all of the processing information, and print it out on a log for analysis.

The computer also keeps precise up-to-the-minute data on crude coming in and the output of finished products. On command it prints out a complete breakdown for the month, accounting for every barrel. "Now we know at once where everything is," says Wolfer. "And that's no small accomplishment." ■

Fifty years ago a 42-gallon barrel of crude oil yielded about 11 gallons of gasoline. Today it yields nearly 19.

The reason, says the American Petroleum Institute of Washington, D.C. —improved methods of refining.

"If no improvements had been made . . . since 1920," says A.P.I., "refineries would have to process more than three billion barrels of additional crude oil per year to meet our gasoline requirements today."

"Everything but the squeal" is extracted from crude oil in these Mobil Oil catalytic crackers, silhouetted against the Illinois sky.

King Coal

With oil prices going up, the old-fashioned monarch is coming back into style. Computers are part of the restoration.

An underground coal mine is a strange and awesome world 200 to 2,500 feet below the earth's surface. The mine is moist and silent, with a blackness barely broken by the miners' lights.

For years, the coal from such caverns was the world's primary fuel. It once produced about 90 percent of all electric energy in the U.S. But, after World War II, diesel locomotives replaced coal-burning steam engines. Plentiful and less costly supplies of fuel oil and natural gas began to replace coal in the home and industry. After a period of falling coal production, however, the trend was reversed. Between 1961 and 1971, output more than doubled as electric utilities consumed more fuel to meet the nation's soaring power demands.

Today coal still represents a major fuel supply for electric power generation. And coal reserves—the largest of any fossil fuel—total about 400 billion tons, a 300-year supply (with present mining methods and usage). Almost half the known reserves are in the U.S., according to the National Coal Association. And, despite environmental and technical problems in relying on coal as an energy source, it is expected to continue to play a major—indeed, an increasing—role in meeting U.S. energy demands.

Over the last few years, the computer has become an ally of the coal industry. It is helping to make mines safer and determine how much coal is underground and how best to mine, process, and ship it.

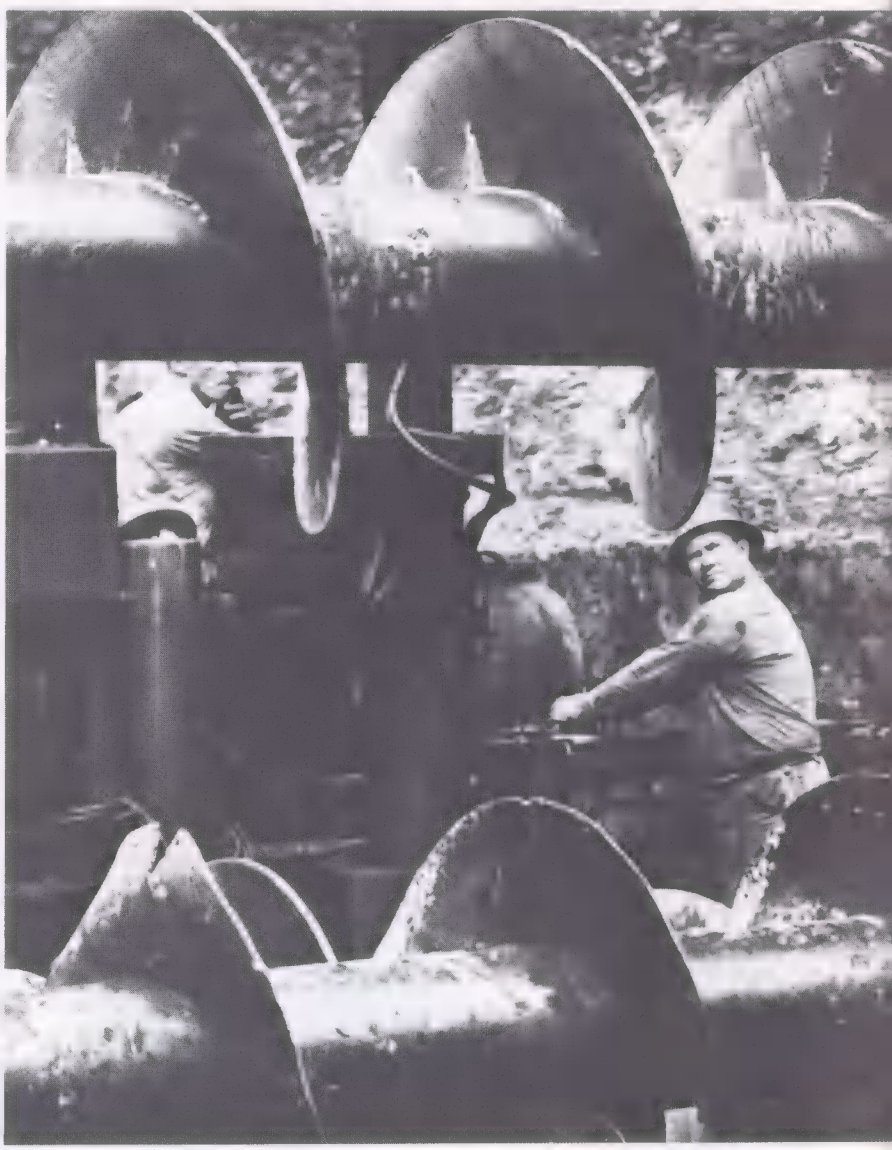
The main drawback with most coal is its high sulfur content and the amount of fly ash it produces. Techniques are being introduced to reduce these environmental hazards, and research projects using the computer are underway to make coal a cleaner fuel. The most hopeful prospect is "gasification." With one promising, experimental technique, super-heated steam is fired at crushed coal to produce gas that can be scrubbed of impurities and used as a fuel.

As oil and gas supplies shrink, and new sources of energy are slow to develop, experts predict a rising dependence on coal, particularly if it can be turned into gas. They say the growth of the industry will depend on how well safety, health, and environmental problems are resolved. The computer is ex-

The nation's appetite for fuel is being fed increasingly by coal. This mammoth, 20-story high, $15-million power shovel scoops tons of earth in a single pass, exposing the coal lying beneath. Strip mining equipment then removes the coal from the open vein.

pected to play a key role in these efforts, too.

Coal is one of nature's intriguing phenomena. Like oil, it is believed to have been formed millions of years ago when layer upon layer of plants decomposed in swamps. They were covered by water, dirt, and more lush plants. The compacted mass was pressed down upon by onrushing seas. The earth heaved to form mountains and valleys, and underneath were seams of coal.



Boring into the heart of an Appalachian mountain, these massive drill bits are "stacked" one after the other, until an entire vein of coal is extracted. The ore is ejected at the rear of the drilling line, much the way a hand drill spews chips as it bites into wood.

In the early days, coal was taken from surface or shallow deposits by men using picks and shovels, loading the fuel into baskets and dragging them laboriously over rough ground.

Today, coal mining has become largely mechanized.

In conventional mining, a cutting machine first makes a deep cut into the coal so that it will break more easily when blasted. A drilling machine then bores holes into the deposit, metal tubes are sunk in the holes, and compressed air is forced into the tubes to break the coal in pieces. Explosions also may be used to free the coal. As chunks break loose, a loading machine creeps forward "like a huge mechanical crab," scooping up the loose coal and loading it into a mechanical truck, or "shuttle car," which carries the coal away.

With "continuous" mining, a huge machine with sharp whirring teeth chews into the coal. As it advances, the coal is pushed aside for a loading machine, or loaded directly into shuttle cars.

With a method known as longwall mining, a propeller-like set of whirling blades travels back and forth along the several hundred feet of a coal wall. The coal is shaved off—or planed like wood—and falls onto a conveyor. As the machine advances, huge 400- to 600-ton jacks are put in place behind it to support the roof of the mine.

The computer is the miner's latest tool.

"As far as computer use is concerned," says George Henning, controller of Eastern Associated Coal Corporation, "we are only beginning to open the door."

Eastern, an affiliate of Eastern Gas & Fuel Associates with headquarters in Pittsburgh, is a major supplier of coal. It produced 10.7 million tons last year from 16 mines in West Virginia and 2 in Pennsylvania.

In 1968, the company installed a System/360 Model 30 primarily for accounting. Last year, Eastern switched to a System/370 Model 135. "Now," says Henning, "we're starting to use it for production applications."

Like other coal companies, Eastern is striving to optimize production and meet new safety and health regulations, part of the Federal Coal Mine Health and Safety Law of 1969. Strict enforcement has caused some mines to close and has disrupted production in others. The computers help companies meet the regulations and introduce efficiencies that offset the higher cost of compliance with the new rules.

According to *Business Week*, in fact, one of the toughest problems facing mine owners is the demand, by the men who dig for coal, for more and better safety measures. While mining is much safer than it used to be, it obviously still has its hazards.

To try and eliminate such hazards, for example, one of Eastern's mines is hooked up to computers to supply data for the University of West Virginia's safety research program. The company also keeps track of its internal safety program and analyzes accidents.

Says Henning: "The computer tells us who has received training and who needs a refresher course. It also gives

us work profiles for various mines . . . This information enables us to optimize production by designing mines better. It also helps us meet stricter state and Federal programs."

Within the last few months, Eastern has been building simulation models in its computer.

At the company's Federal Number Two mine, in Fairview, Va., for example, there was a ventilation problem recently. More air was needed to meet new U.S. regulations. In addition, as more men work in a mine to boost production, more air is required. And the air must be continually adjusted as the miners get deeper into the mine.

In putting down the shaft, Henning explains, "you must think not only of the size and type to bore, but also of the passageways and overhangs that can divert the air. By using the computer, we could investigate more possibilities and find the optimum solution. It allowed us at least 50 shots. Without it, we would have had to make our decision on the basis of two or three tests."

Almost no end to ways coal producers use computers

▪ Building transportation models. Underground, there may be up to 30 locomotives and 500 mine cars, each carrying eight to ten tons of coal. "It's quite a transportation network," says George Henning of Eastern Associated Coal Corp. "The models enable us to determine how the system should be built, where to put side tracks, and how many cars are needed to handle particular volumes. Right now, we're simulating the expansion of some mines to carry volumes of coal projected for the next two to three years."

• Interpreting information from "bore holes." Geologists bore a hole to get a core sample for exploration or expansion purposes. The sample is analyzed. From this data, the computer maps out what the seam of coal looks like. Geologists can then make elevation and sulfur-content maps.

▪ Developing a mining plan for an entire area. Charles Acuff, director of data processing for the Peabody Coal Company, the largest single U.S. coal producer, says: "With a computer we hope to produce a better plan which will enable us to produce more coal cheaper and faster."

Such a plan would help determine whether a mine is to be dug from the surface or underground; what route to use in mining; how the ventilation should be set up; where the roads and power supply will be; what equipment to use; whether to wash the coal and remove the impurities or sell it raw; and whether to mix different types of coal to produce a lower sulphur content and a greater heat.

• Designing a conveyor belt to move coal from the mine. A computer simulation helps determine how fast the belt should move, how long it should be, how wide, and how much coal it can take out. The computer then evaluates the result if the belt were wider, faster, longer, or made of different materials. Peabody's Number 10 mine, in Pawnee, Ill., which produces five million tons of coal a year, has over 100 miles of conveyor belts. Its tunnels radiate in several directions, some of them up to seven miles long.

In strip mining, Peabody uses 20-story-high, $15-million shovels to remove the earth overlying coal beds. Much smaller machines are used to remove the coal.

Strip mining accounts for about half of all the coal mined in the United States but it has become an incendiary issue among environmentalists. However, *The New York Times* observed editorially only last November, "in this country mined-over land has been turned into grazing meadows, successful commercial farms, woodland and even recreation areas. Rigidly enforced laws on strip mining and a considerable revival of deep mining, with adequate health and safety protections, could make coal the surest and safest bet to fill the energy gap—at a price just high enough to persuade the American consumer that the earth's energy is not a commodity endlessly free for the taking."

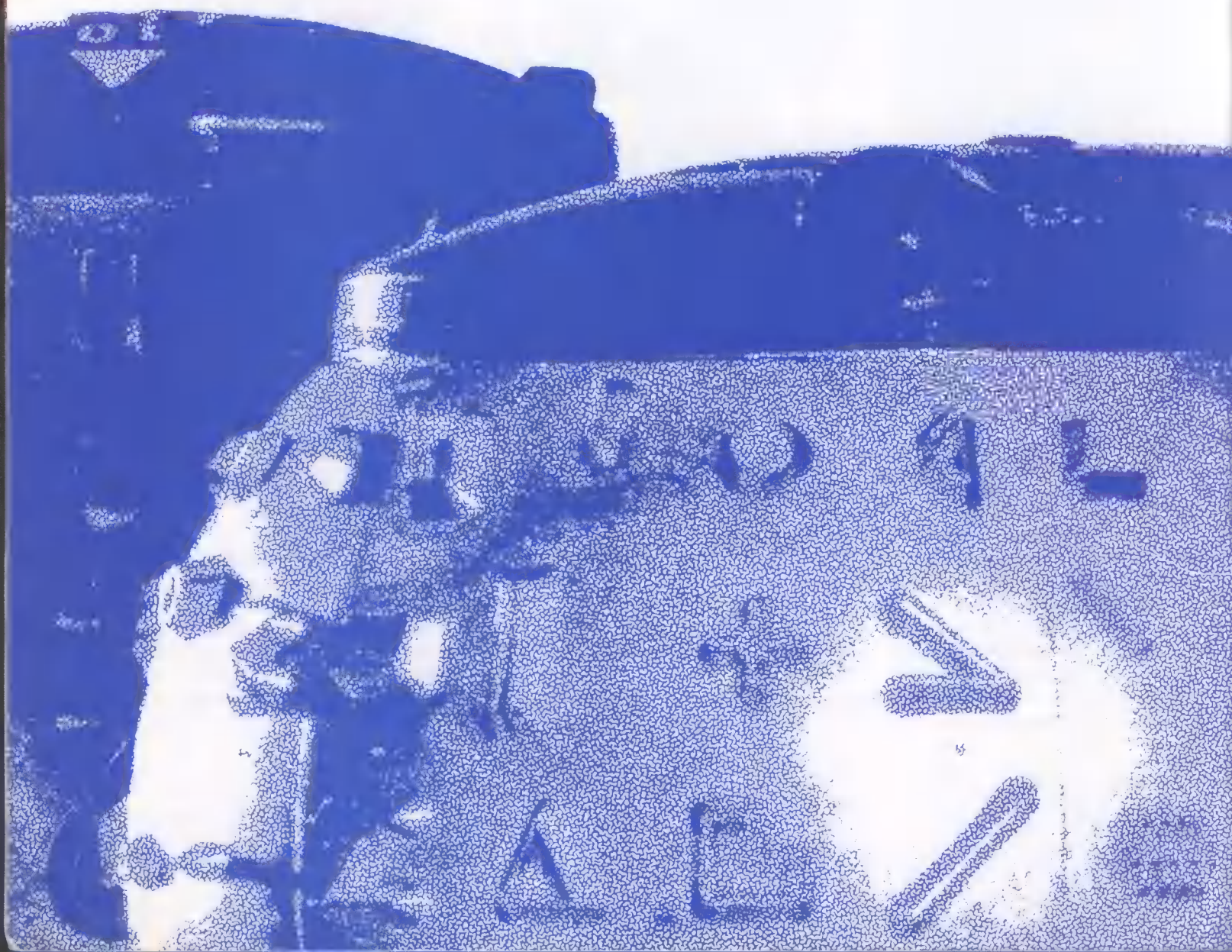
Peabody insists that through its land reclamation program, the damage from strip mining is minimized or altogether corrected. The computer may be used in reclamation by helping determine the composition of the earth removed. "The core sample can be used to tell us how to dig," says Acuff. "By knowing the composition of the earth we remove, we learn where and how to replace the overburden. If earth containing pyritic compounds were put back on top, for example, it could produce acids when it rains. That would lead to water pollution. Now we often separate the top soil and put it back on top. This makes for better reclamation and minimizes the water-pollution problems."

Peabody hopes to use the computer more in long-range planning, according to E. S. Jones, vice president, administration; and William G. Stockton, vice president of public relations and traffic. They think this will be especially important in meeting environmental regulations.

Jones says: "If we can construct better mines than in the past, and we think we can, it should help us produce more coal and develop mines faster. It now takes one to three years to plan and develop a mine. With the computer we hope to speed things up." ■

Even on the atomic chart

There's no other element



by Richard Bode

like it

Since its inception, Labanotation—the notation system for recording human movement—has undergone only minor modification. *(See page 29.)* But until recently it had been limited by one serious drawback: the notator had to prepare the dance-script by hand. In practice, the final manuscript for a choreography was usually drawn by an artist trained in Labanotation who could render the symbols with proper emphasis and clarity.

Hoping to speed up this process, members of the Dance Notation Bureau, Inc., a nonprofit educational institution headquartered in New York, approached IBM in 1965. They were searching, they said, for a way to reproduce dance notation symbols mechanically. They were referred to Bill Maloney, vice president, product management of the Office Products Division. Maloney, who at the time was based at 590 Madison Ave., suggested that the Bureau and IBM work together to create a special Labanotation element for the IBM Selectric Typewriter.

What followed was nearly eight years of collaboration between a group of dancers and notation directors at the Bureau and a team of IBM product engineers and type designers in Lexington. Earl Crowe, an OPD project engineer, was among the first to visit the Bureau's headquarters and he recalls the experience vividly.

"I just couldn't believe," he says, "that people could actually dance from these complex symbols, and I wanted to see how it was done. Lucy Venable (a dancer and notator) dispelled my skepticism once and for all. She read a dance-script and then performed, dancing across a small office and sometimes out into the hall. Then she would pause, come back and read the script, and dance some more."

Crowe returned to Lexington, convinced that a new typing element could, indeed, expedite notation and make it easier to duplicate scripts. But he was faced with the seemingly impossible task of fitting Rudolph von Laban's myriad symbols on the small element. There are literally hundreds of combinations in Labanotation, but the Selectric Typewriter element has surface for only 88 characters.

Crowe and his colleagues solved the problem by designing the sphere so that a typist builds a symbol with several strokes of the keyboard, backspacing after each stroke. The first stroke, for example, may print a box, the second stroke a symbol that resembles a numeral 3 printed backwards, and the third stroke a simple vertical line.

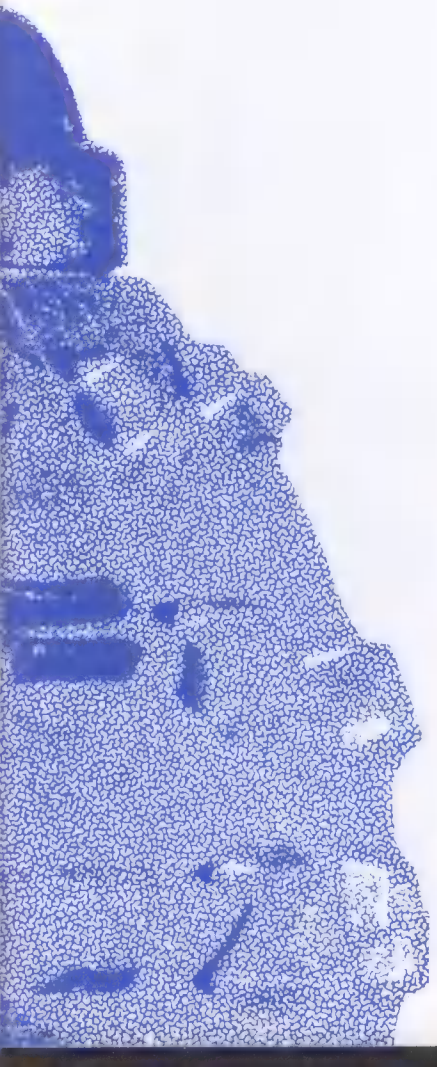
"It all boiled down to a problem of arrangements," says Bud Kettler, manager of the type design department, which designed the typewriter notation symbols on plastic sheets 100 times actual size and then reduced them to .080 inches in height for tooling. "Spacing between symbols had to be precise, and the location of the symbol on the element had to be coordinated with the preferred keyboard button. That took a lot of time, manipulation, and compromise."

Another difficulty was overcome fairly early in the collaboration. The ordinary typewriter prints from left to right, but Labanotation proceeds from bottom to top along the vertical staff. Earl Ubell, a former science writer, currently news director for WNBC-TV, and a member of the Bureau's board, came up with the solution. He suggested typing in the usual way, and then turning the page 90 degrees upon completion. And that's exactly the way the typewriter works. Symbols on the element are flipped over on their side so that they can be typed normally along a horizontal staff. But when the typist is finished, the page is turned so that the staff is vertical and the symbols are readable and in place.

Bill Simpson, sales engineer, sees a fairly sizable number of prospective users for the Labanotation typing element. "There are 90 universities alone that teach the dance," he notes, "and all of them are potential customers. The nice thing about the Selectric Typewriter element is that the user doesn't have to dedicate the typewriter to a single purpose. For $18, the college can buy a typing element and interchange it with other elements according to its needs."

The market potential, of course, extends well beyond the universities, and even beyond the dance. "This is just the first step in making movement notation more accessible," says Herbert Kummel, executive director of the Dance Notation Bureau. "Ultimately we hope to collect data on all forms of human movement, feed the data into a computer, and make comparative studies that could have a bearing on physiotherapy, athletics, anthropology, and the behavioral sciences."

The past experience of IBM type engineers and designers contributed im-



The abstract language of dance, "Labanotation," on the element at the right, has been added to a long list of languages available for the IBM Selectric Typewriter. Symbols on this unique element can be used to record a dancer's movements. Element on the left is in the Cyrillic alphabet.

measurably to the development of the Labanotation printing element. The idea, for example, of combining characters to build esoteric symbols wasn't entirely new; it had already been applied to the creation of typing elements for technical disciplines. The Selectric Typewriter element used for typing scientific papers contains many technical signs—radicals, summations, integrals, and deltas—formed from more than one keystroke.

In some cases, OPD engineers not only had to develop a special element, but they also had to modify the typewriter. One machine (called Kadurit) prints in Hebrew—a particularly difficult accomplishment since the Hebrew language reads from right to left. The typewriter (marketed only overseas) has a special switch which allows the carriage to move either from left to right (for English) or right to left (for Hebrew). The keyboard contains both English and Hebrew letters—the English in black and the Hebrew in white, both against a gray background.

Another typewriter (called the Dualelectric) developed for the Thai language is especially intriguing. Most typewriters print, then move a space after the typist strikes a key. In the Thai typewriter, the carriage first advances a space and then prints. This unusual procedure allows the typist to cope with the Thai language which has 52 consonants, plus 14 vowels, 8 of

(Continued on page 30)

It may look easy, but it's not

The IBM Selectric Typewriter element is so compact that it's easy to overlook its complexity. Yet, of all IBM's many product innovations, few are more dramatic than this truncated sphere that types 15 characters per second as it gyrates at lightning speeds.

Each time the typist presses a keyboard button, the element tilts, rotates, prints, and returns to its original position. Slow-motion pictures, which "stop" the sphere as it strikes the paper, caused one observer to remark: "It looks like a small boy rising to greet a tall girl."

Even the manufacture of the element appears deceptively simple. A green granulated plastic powder is fed from a hopper onto a mold where it is subjected to more than ten tons of pressure at high temperatures. Less than a minute later, the molded type element pops into view.

Subsequently, the element is nickel-plated through a process which enables the metal skin to adhere to the plastic surface with tremendous tenacity. The plating process was developed by two IBM engineers, H. Allen Rogers and W. E. Petrie, before the IBM Selectric Typewriter was introduced in 1961.

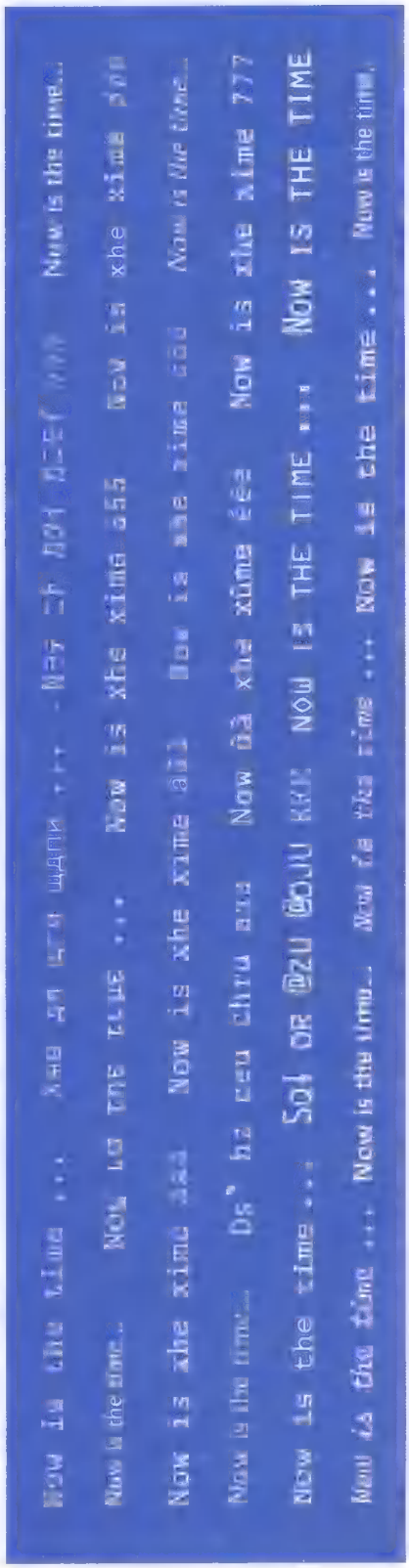
Numerous pieces of sophisticated equipment check the element for weight, surface finish, blemishes, and voids. Before and after plating, it is weighed to one-tenth of a milligram.

The elements are manufactured in Lexington, Ky., and Boigny, France.

Development of the element for the Selectric Typewriter has also involved IBM heavily in type design. Professional designers have created more than 30 different type styles. In creating a new type font, designers draw characters on clear plastic sheets 100 times larger than they appear on the typing element. The characters are photographically reduced, then engraved on slides which comprise the mold.

"In design, everything is optical, nothing mechanical," says Bob Kniffen, manager of type production engineering in Lexington. "The designer isn't restricted by geometry. Everything depends on the visual relationship of the characters.

"But tooling," he quickly adds, "is something else. An element for the Selectric Typewriter contains 88 characters, and each character is positioned on the sphere to an accuracy of one-third the width of a human hair."



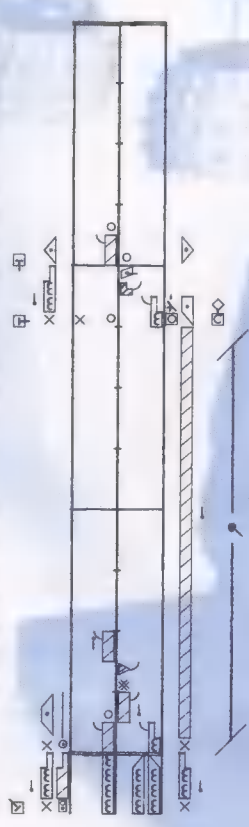
Now with a new element on the IBM Selectric Typewriter, you can let your fingers do the dancing.

Consider the infinite variety of human movement. The grand jeté—the high, arching leap of the ballerina. The forward lunge of the football player as he stretches to catch a pass. The crisscross travels of the warehouse worker as he stocks goods from a stacker-crane.

All have one characteristic in common: They exist for only an instant in space and time. Unless they are accurately recorded as they occur, they can't be analyzed or compared, a necessity, for instance, for the proper study of the dance—man's oldest art form.

The inadequacy of that situation distressed Rudolph von Laban, an Austrian architect and engineer who was interested in every aspect of human movement—in the theatre, the factory, the hospital, and the marketplace. In the early 1920s, he began to search for ancient movement symbols.

After years of study, experiment, and controversy, von Laban published in Vienna in 1928 a book called *Schrifttanz* (written dance), which represented a notation system, now known as Labanotation, for recording movement. The development of that notation system is now generally accepted as the single most important step in the creation of a literature of movement and dance. The noted choreographer, George Balanchine, was so impressed with Labanotation that he decided to have all his ballets recorded to make sure they were accurately performed. He found the notation system far superior to film in which the perspective is limited and the image fleeting and blurred.



Labanotation offered two important innovations: a vertical staff that represents the upright human form, and elongated symbols which, by their length, represent the exact duration of any action. Ann Hutchinson, von Laban's friend and disciple, observes in her textbook *Labanotation* (Theatre Arts Books): "It (Labanotation) provides a universal understanding of movement and hence serves as a common language through which workers in all fields and in all countries can communicate."

Until recently, the difficulty of recording dances by hand had frustrated the widespread use of Labanotation. As a result, many classics were lost for want of a practical way to preserve them. But now for $18, you can buy a Labanotation element for the IBM Selectric Typewriter and let your fingers do the dancing.

Left: A typeout in Labanotation from the IBM Selectric Typewriter. It tells the ballet master that what is called for at this point in the score is a bourée avec port de bras. *That's ballet language for a graceful step across the stage with a movement of the arms. The illustration is from a reproduction of a famed ballet sculpture by Degas. One of the greatest of the 19th-Century French Impressionists, Degas turned to sculpture when he was nearing 50 and going blind. He died in 1917 at the age of 83.*

(Continued from page 28)

which must appear either above or below the consonants on the written line. These 8 vowels are actually dead keys on the machine. Thus, when a typist hits a consonant key, the carriage advances and then prints the character. Then, on the next stroke, the vowel key is struck, and it prints without advancing a space. On the next stroke, the carriage advances and prints.

The Dualectric also overcomes another difficulty, the fact that many English words have no direct Thai translation. Like the Kadurit typewriter, the Dualectric has a dual-language keyboard and interchangeable Thai and English typing elements. The typist can flick a switch so that the machine prints and moves in either the Thai or the English manner. The Thai-English typewriter was introduced in May 1973, and the first machine was presented to His Majesty King Bhumibol Adulyadej of Thailand.

Other typing elements have been developed for the Cyrillic alphabet, for both modern and ancient Greek, for the Japanese Katakana alphabet, and for all the Romance languages.

Special type elements have also been designed at the request of a specific organization. The Pickle Packers Association, for example, requested a typing element that includes their logo—a pickle. Other organizations, such as Westinghouse and Underwriters Laboratory, have IBM Selectric Typewriters that type their familiar trademarks.

Yet another element can type optical character recognition symbols and English letters at the same time.

Says Bill Simpson: "We're not offering our customers a typing element at all. What we're offering them is attractive correspondence, a neat and readable manuscript, a simplified method of written communication." ■

Richard Bode, a freelance writer, has a background that embraces both technology and the arts. A business journalist by profession, he holds a graduate degree in fine arts from the School of the Arts, Columbia University.

Another

Office Products does it again with its new IBM Memory Typewriter.

Who needs a desk-top typewriter with almost half the number of logic circuits of an IBM System/360, Model 50 central processing unit?

Thousands of people do, according to the Office Products Division which, on March 1, announced its latest product—the IBM Memory Typewriter.

Approximately 4 inches wider and 2 inches deeper than the IBM Selectric II Typewriter, the new machine is evidence of the packaging skill of the engineers who developed it at OPD's lab and plant in Austin, Texas.

There's no separate console such as that on the MTST and the IBM Mag Card typewriter series. There's no visible magnetic medium—tape or mag card. In their place is a self-contained 4,000-character memory and a 200,000-character magnetic storage action file capable of holding up to fifty pages of typing.

In operation, the IBM Memory Typewriter is very much like OPD's other magnetic keyboard offerings—with one major exception. The operator need not handle a magnetic card or tape. Instead, typing is done directly into the machine's one-page memory, where it can be edited or reformatted before being routed into storage at the press of a button. The memory then comes up blank for the next page of work. Material thus stored can be moved back to memory for rework at any time and then re-stored as well. New material added to storage will purge the old.

Fittingly, the Memory Typewriter makes its bow just about ten years after OPD's premiere magnetic keyboard product hit the market—in the form of the MTST. And as technologically advanced as the MTST was, it would take approximately 10 MTSTs to match the equivalent logic circuitry of one Memory Typewriter.

"The Memory Typewriter is a totally new machine—a super typewriter," says Bart Stevens, IBM vice president and president of OPD. "It's the kind of machine customers who want *typewriters* can understand." ■

Thoughts

The arithmetical machine produces effects that approach nearer to thought than all the actions of animals. But it does nothing that would enable us to attribute will to it, as to the animals.

Blaise Pascal

One cannot collect all the beautiful shells on the beach.

Anne Morrow Lindbergh

There may be more beautiful times: but this one is ours.

Jean-Paul Sartre

In rivers, the water that you touch is the last of what has passed and the first of that which comes: so with time present.

Leonardo da Vinci

Nature drives with a loose rein, and vitality of any sort can blunder through many a predicament in which reason would despair.

George Santayana

It is only in literature that coincidences seem unnatural.

Robert Lynd, Anglo-Irish essayist and journalist (1879-1949)

The shrewd guess, the fertile hypothesis, the courageous leap to a tentative conclusion—these are the most valuable coin of the thinker at work. But in most schools guessing is heavily penalized and is associated somehow with laziness.

Jerome S. Bruner, psychology professor, Oxford University, England

There are no conditions to which a man cannot become accustomed, especially if he sees that all those around him live in the same way.

Leo Tolstoy

The problem is not shortage of data, but rather our inability to perceive the consequences of the information we already possess.

Jay W. Forrester, professor, Sloan School of Management, M.I.T.

All in the family

Clair Doran and his two sons are in a pleasant rut. They all made the Hundred Percent Club in the same year.

It started out like a run-of-the-mill January morning in Milwaukee for Clair Doran, a salesman in the Information Records Division. He visited a customer, then stopped by for a meeting at the IBM office where he works.

But the meeting never took place. Instead Doran was called to the telephone to talk to a man with a keen interest in what is probably an IBM first.

The caller was Frank Cary, IBM chairman of the board, and he wanted to congratulate Doran for making the 1973 Hundred Percent Club. Nice, making the Club, but hardly that unusual. What intrigued Cary was the fact that two of Doran's sons, Mike and John, also made the 1973 Hundred Percent Club—with the Office Products Division.

"Was I surprised to get a call from Frank Cary?" says Clair Doran, who is 57 and has been with IBM since 1941. "You bet I was. He said the company was proud of what my boys and I had done."

As far as anyone can tell, this is the first time in IBM that a salesman and two of his sons have all made the Hundred Percent Club in the same year.

Mike Doran, 30, a graduate of the University of Iowa, works out of the Dubuque field office, which reports to the Cedar Rapids branch. Now in his fifth year with IBM, he credits the concept of word processing with helping him reach his sales objectives.

His familiarity with IBM goes back a long way, and includes such memories as Duluth, Minn., where his father was a time equipment salesman and kept his desk in his oldest son's room. "When he had work to do," says Mike Doran, "I did my studying at the dining room table."

John Doran, who is 22, joined the Minneapolis branch right out of the University of Iowa, where he majored in journalism and played on the football team. Before he joined the company, he visited his brother in Dubuque and spent several days with him as an on-the-job observer. He liked what he saw. Last year was his first on quota, and, to nobody's surprise, he made the Club.

"I've got a married daughter and another son, 14, at home," says the elder Doran. "So far, at least, he hasn't said anything about going to work for IBM. He'll have to hurry if *four* of us are going to make the Club." ■

Frank T. Cary

Equal opportunity

IBM's chairman steps up to some tough questions. He was interviewed at the request of the editors of *Black Enterprise* magazine.

Would you tell us about the most striking changes you have seen among black professionals in the last ten years?

I think blacks at IBM have a great air of confidence now, much more than they had ten years ago. I think there must be more blacks coming out of colleges today with greater skills. That's very gratifying to me, because I know those people are going to be successful, or the probability of their being successful is very good, not only initially but long-term. That's going to give us better representation of blacks in managerial and professional positions.

What makes a corporation see the value of not only employing blacks and providing equal opportunity, but promoting blacks on a merit basis to meaningful positions?

I think this probably gets back to something we talked about earlier, and that is, how does top management look on it? Do they look on it as something nice they're doing for the black community, or as something that's very basic and fundamental to our business? We've always looked at it the latter way. It's very important to us that we draw on all sections of society. But if we're going to be tops in our field, we think we have to promote people on the basis of competence. We've brought in the very best people we could get. In some cases, we've given them lots of special training and opportunities to help them. But anybody who's made it, in terms of becoming a manager, has made it because he or she was competent. We think that's the only way you can run a business long-term. If you start down the other road—well, there was one nationwide program that was very well-intentioned, but I think it got some people into jobs they couldn't do, with expectations they couldn't fulfill. It was terribly frustrating for most businesses and for the people affected. So, what I'm talking about is getting the right kind of people in the right kind of jobs. And if in some cases some of the people haven't had all of the advantages they should have had, then I think the company has to step up to that and give them opportunities for special training to try to bring them along. But our approach is to try to increase the individ-

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ual's ability to compete for management jobs, not make someone a manager just because of color.

Have there been any complaints from white employees about black advancement into managerial positions?

Well, there have been some concerns about what you'd call reverse discrimination, but I would say those have arisen when we have not communicated well what it is we're trying to do. The important thing that's happened, I think, is that so many blacks who have been promoted into managerial jobs have done so well that it's obvious to everyone that they are perfectly competent. And once you get a group of managers who have really proven themselves on the firing line for some period of time, then acceptance increases enormously. That's what I meant when I said there is a certain amount of momentum and much less resistance to equal opportunity—not just for minorities but for women as well. Equal opportunity is moving well and moving right, I think. There are always imperfections and individual abuses, and managers who still don't understand, but it is gratifying to me to see the acceptance and the momentum that all these programs have.

When determining corporate policy with regard to equal employment, particularly for blacks, you have to make some very basic decisions. And one of those decisions has to be whether or not to treat blackness as a primary problem or as a secondary problem. How do you decide, and what has your decision been? Do you say we're going to hire this person because he is black, and because he is, we are going to keep an eye on him and help him with special programs? Or do you say, we're going to hire a person, hopefully one who is black, and give him an opportunity to succeed just like everybody else?

Well, we don't hire people just because they're black. Let's say we have a black person in the company for a while, and we see that he or she is successful and has the potential to be a manager but is deficient in some respects. Individuals like that we're going to get into the pool of people who are competing for management positions by accelerating their training and giving them special kinds of experience—assignments and projects that will develop them faster. And so we may give them quite a bit of special attention in that sense, to get them into competition with other people for managerial jobs. We believe that most of the people we're hiring in this company who are black don't really need any special help at the entry level. They come to us, for the most part, fully equipped to compete for their jobs.

What advice would you give a young black, coming out of high school and going to college, who is trying to decide what career to aim for?

I'd say, if you do well in physics, chemistry, and hard sciences, become an engineer, because almost every company in the world would love to be able to find some very competent black engineers.

Doesn't that reflect a situation that carries at least a whiff of reverse discrimination, where a person being black becomes a primary consideration?

Not really, because if that person is not an engineer, being black won't make any difference. Corporations that set about—as we and many others have—to try to get representative elements of the population in all functions of their business have this problem: You're very successful in employing blacks in sales, administration, in customer engineering, manufacturing, and so on, but you've got this laboratory and it has no blacks at all. There are Orientals and Latin-Americans, but few blacks. You'd like to find some black engineers at this point. And you know they're going to be there sometime, but for a variety of reasons they just aren't coming through, or if they are, there are so few, and there's such tremendous competition for them that you can't get them in anywhere near the numbers you'd like. I really think that getting competent people who represent all segments of the population is a worthwhile goal of any business. Reflecting the composition of a community gives everybody an equal kind of opportunity. Today, in talking to blacks at IBM, I get the feeling a lot of them are uptight about the fact that we don't have more black engineers. They don't really understand it themselves, and they think that maybe we're not out looking hard enough, or that that laboratory manager is somehow prejudiced and isn't hiring them, or whatever. I just think that you could break down a lot of those myths in society if you have some representation from all groups in the community. Over a period of time, we will employ them, when they're available, and without in any way downgrading competency or promotion on the basis of merit, or any of the other basic principles of business.

The magazine, *Black Enterprise,* **is, itself, an excellent example of black enterprise.**

Founded in 1970 by Earl G. Graves, who had been an administrative assistant in New York for the late Senator Robert F. Kennedy, *Black Enterprise* showed a profit the first year it was published, has operated successfully since.

Graves, now 39, is a soft-spoken man who grew up in Brooklyn's Bedford-Stuyvesant section, where IBM opened a plant in 1968.

Black Enterprise, started on a shoestring, is mailed free every month to about 150,000 middle-income blacks—"that small percentage," says Graves, "that spends nearly 50 percent of the U.S. black income." It also goes to the top three executives of the nation's 500 largest corporations.

Recently identified by a publishing-industry newsletter as the third fastest moving magazine in the country (in terms of increased ad revenue), *Black Enterprise* is aimed at people "who travel a lot, rent cars . . . and who dream of starting their own businesses, moving up the ladder, making it." ■

To college students with the right qualifications, the company again is saying

IBM NEEDS YOU

One out of 10 interviewed is offered a job. Of these, 70 percent accept.

by Claire Stegmann

The recruiters are back.

After three lean years, when a sluggish economy reduced its flow of new talent to a trickle, IBM is once again tapping the campus for people.

Last year, the company welcomed about 13,000 new employees in the U.S., and an equal number abroad. This year, barring unforeseen developments in the economy, the figures should be about the same.

No one is more delighted to see new talent come on board than IBM's division presidents.

The System Development Division, for example, hired more than 800 new employees in 1973, including 162 new college graduates that Bob O. Evans, IBM vice president and SDD president calls, "the cream of the crop." And that, says Evans, is especially important "because it lessens a concern that many of us had in 1971 and 1972, for we know that to keep IBM moving, we must have a meaningful influx of creative people with new viewpoints."

Says Ted Papes, IBM vice president and president of the System Products Division: "Our campus recruiting effort is the largest we have had in recent years. SPD is looking to fill more jobs, both number and kind, including entry positions in engineering science, programming, and other disciplines. These new people are expected to enrich our business and bring added vitality to our product programs."

Adds IBM Vice President and Federal Systems Division President John B. Jackson: "New people will provide a fresh dimension to the technical knowledge and skill we bring to bear in important government programs."

As usual, more than half of 1974's new IBMers will be hired directly at the local level. But some 2,000 new engineers, programmers, and marketing people are being actively recruited from the nation's college campuses, by IBM's Corporate National Recruiting Organization and by the divisions.

Created during the halcyon hiring days of the System/360, NRO was all but disbanded as the '70s turned the corner. Now, full-time NRO managers —supported by a staff of college representatives and a select corps of experienced IBM managers—have just completed a period of heavy interviewing at campuses across the country.

During the college spring break, selected students are guests at IBM branch offices, plants, and laboratories, where final decisions are made.

The recruiting cycle begins in the fall, when NRO staff members and the IBM divisions match division requirements against available resources within each NRO manager's territory. Some territories cover as many as 14 states and 55 schools. On-campus recruiting is usually heaviest during the months of October, November, February, and March. But on-campus visits are also scheduled in the summer.

Managers who will do recruiting are carefully chosen. As Roger Williams, NRO East manager, explains: "They have to be IBMers who like to take a day or two out once or twice a year to talk to students. If the manager's thoughts are back at the office, that attitude will show through."

A large part of the NRO manager's job is to maintain year-round college contacts with placement officers and counselors, and he is apt to spend two-thirds of the working year on the road. Irv Pfeiffer, NRO manager for the Midwest, reports that he was away 140 out of 260 working days last year and expects to be gone more often in 1974.

When his staff of five college reps was cut in 1970 because of lower requirements, Pfeiffer kept in touch with a few of his key schools by instructing large groups of students about the hard realities of the job market.

"I often started my talks with, 'You probably wonder why I'm here,' he says with a smile. "But I think that the counselors, teachers, and students really appreciated our frankness and attempts to help. Now that we're back, we get an excellent reception."

Adds Harley Thronson, NRO West manager: "Our job as recruiting managers became one of overall corporate college relations, involving technical gifts, fellowships, and other programs not directly connected with recruiting."

What, if anything, has changed in IBM's requirements over the past few years? "For one thing," replies Roger Williams, "the company looks for people with more computer experience. When I was out there before, we were concentrating on math majors, but today so many schools offer computing science that we go for combined electrical-engineering-computer science degrees. It means less training time."

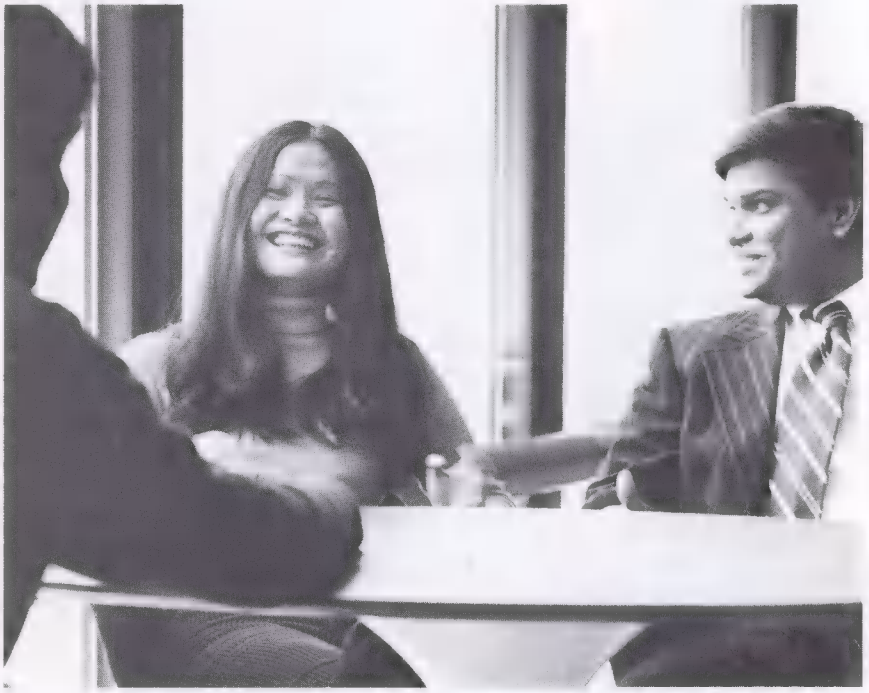
Says an IBM executive for the General Products Division: "We've become more specific in our hiring practices. Today we want to know exactly what

At the University of Illinois, NRO Midwest Manager Irv Pfeiffer pauses for a chat with students Joyce Freese, Roger Jackson, and Robert Bretzlaff. During IBM's lean hiring years, Pfeiffer maintained his key college contacts.

NRO *East Manager Roger Williams, left, is back at Columbia University's Graduate School of Business—with Dean J. Fredric Way and assistant director of placement, Anita Lands.*

Below: In the Yorktown Heights research library, new Ph.D.'s Robert Printis, left, and Lilian Wang enjoy reminiscing with Dr. Varadachari Sadagopan, manager of scientific relations for the Research Division.

Right: San Jose's Loretta Bowen, GPD, *talks with a student from the University of California at Berkeley. She is looking for engineers.*



an engineering job will entail, then we try to find an experienced candidate. It makes interviewing tougher, but I think we're getting better new professionals than ever."

GPD is placing heavy emphasis this year on engineers for manufacturing areas. A GPD recruiter in San Jose has a tough time, at first, selling the concept. "Traditionally, engineering opportunities have been associated with laboratory areas. But new technologies have opened up interesting software opportunities in the manufacturing engineering support functions as well."

Although larger schools like Stanford and the University of California have been IBM's best sources for young talent in the past, San Jose recruiters are now looking to smaller schools, like Utah State University, for manufacturing engineering programs not offered in the larger curriculums.

The country has changed, too, in relation to competition. "IBM is still a glamour company," says one recruiter, "and viewed as one that's tough to get into, but there are a lot of other good companies out there with good jobs, and everybody's looking for the same people." Still, IBM's batting average is high. According to NRO sources, one out of 10 candidates interviewed receives a job offer. About 70 percent of these join the company.

One stiff competitor for today's business school graduate, according to J. Fredric Way, associate dean and director of placement at Columbia's Graduate School of Business, is the commercial bank. Bank holding companies entice new college grads with job opportunities in internal consulting, real estate, and securities analysis.

IBM sales trainee Tom Young, who joined the New York Public Sector Data Processing office last June, is an M.B.A. from Columbia who had originally planned to make banking his career. Competition was tough, and his interest waned, so he switched to marketing. But he says he wasn't interested in data processing—at least not to begin with.

"The day the IBM recruiters came to the campus, I was interviewing with other companies," he recalls. "In between, I had half an hour to kill. I had a suit on, so I thought I might as well fill the time by doing another interview —for practice.

"Well, I went in, and IBM marketing manager Bob Riordan really sold me. He invited me to the branch office and made me feel so loved that I figured IBM must be a pretty good company."

Young, a 27-year-old ex-Marine Corps captain, will go on quota this month. But that's not his ultimate goal. "I plan to be president someday," he says, tongue-in-cheek.

Dean Way sees an encouraging sign in the fact that women made up 20 percent of Coumbia's new business class last fall. It is a field where women candidates, traditionally, are in short supply. Another field in which women are scarce is engineering.

Says Thronson: "Most women engineering graduates today have many job offers." One who did, and chose IBM, is Mrs. Arminta Minahan, who joined the San Jose development lab in January from Lamar University, in Beaumont, Tex. "Starting salaries were about the same," she says of her opportunities, "but I chose IBM for two rea-

sons: I have a great curiosity about computers, and IBM looks like a place where a person is given a chance to prove herself."

Minority engineers, generally, are hard to find in the experience of Thronson, whose territory includes high populations of Hispanic origin, Orientals, American Indians; and according to Charlie Cammack, NRO manager for the South. Cammack has a territory which includes 44 colleges and universities, of which 28 are traditionally black. He works out of the Atlanta office where IBM's Faculty Loan Program originated in 1971. Under the program some IBMers have been teaching full time for a year or more at minority colleges.

"We didn't intend it as a part of the recruiting effort," he says, "but already I can see a distinct difference. The kids who have had a chance to take courses under IBMers are much more aware of real live engineering situations. We've hired a good number of them."

How do today's graduates differ from their predecessors? Most recruiters agree that they are more aware of what is going on around them, and more socially conscious. They are also, if not brighter, better trained. "Some of them are so good it almost scares you." ("You mean," said an IBM recruiter at the City College of the City University of New York, as he reviewed an engineering student's record, "you got nothing but *A*'s?")

They are less job-oriented in the sense that they have other interests and will consider more carefully not only what they want to do but where. One computer science graduate, who was interviewed in Berkeley and offered an opportunity in Poughkeepsie, talked it over with his wife for a long time. "We finally decided we couldn't say no; the work was just what I wanted."

Far outweighing questions about the lawsuits, white shirts, or how the energy crisis will affect IBM sales, the biggest student concern, often repeated, is that he or she will get lost in the bureaucracy of a larger company. "You can talk until you're blue in the face," says an experienced recruiter, "and they just don't believe that individual recognition exists in IBM until they see it for themselves."

Two young Ph.D.'s who have recently joined IBM's Thomas J. Watson Research Center in Yorktown Heights, are Lilian Wang and Robert Printis. The Yorktown recruiting group, under the direction of Dr. Varadachari Sadagopan, has responsibility for coordinating Ph.D. recruiting throughout the corporation.

Dr. Printis, a 30-year-old engineer whose current task is research in mathematical systems theory, with application to energy problems, formally receives his doctorate in electrical engineering this spring. He had made up his mind, after leaving the Army, to continue in university work, but his faculty advisor at the University of Maryland talked him into contacting scientists at IBM who were doing exciting work in his field. He has been at the Center since fall.

"I like the freedom here," he says. "It's something that you don't get in smaller companies. Or even in universities as an assistant professor with no tenure. When I went back to Maryland recently, one guy came up to me and said, 'You sold out.' I said, 'I don't think you understand my working environment.' "

Dr. Lilian Wang, 26, joined IBM last October and is currently at work on ecological systems. "I was at Cornell," she recalls, "and when Dr. Ralph Gomory visited the campus last year as an Andrew D. White professor-at-large, I baited him. I asked him if it was possible to do independent research in a large corporation. He replied that he understood some graduate students view large corporations with skepticism, but that IBM research is made up of a lot of individual people. He was so nice," says Dr. Wang, "I was embarrassed that I had been so negative.

"The IBM recruiter on campus that year turned out to be Gordon Lasher, who had taught me physics. I talked to him, but I wasn't really serious until I came to the Center for a visit. It took me just one day to see how wrong I was." ■

New product in a new market

BLOOD CELL PROCESSOR

There are in the United States approximately 6,000 banks which collect, store, and give out not money, but blood.

They include hospital banks, which provide blood for their patients and sometimes to other hospitals; Red Cross banks; other nonprofit community banks; and commercial banks, which buy blood and, in this way, augment the supply from voluntary donors.

The so-called blood service complex also includes pharmaceutical firms which make and market various blood products, primarily derivatives of plasma.

Modern blood therapy has been described as making possible the saving of life "on a scale undreamed of several decades ago, and for conditions that would have seemed hopeless."

It began with the discovery of a way of storing whole blood and of making sure patients got blood that was compatible with theirs. In the last 20 years, transfusion therapy has become increasingly sophisticated. Today, it involves the use of whole blood, various parts or "fractions" of it—red cells, platelets, and plasma—and pharmaceutical derivatives of plasma. The uniqueness of the basic resource, blood, persists. There is no substitute for it.

"This is an entirely new field for me," says IBMer Dave Baird. "But it's a new field for the company, too. When I first began calling on hospitals and blood banks, people would tell me they didn't know IBM was in the medical technology business. But that's beginning to change. We're beginning to make a dent. More and more medical people are now well aware that IBM is marketing something other than business machines."

Baird is one member of a small team of Information Records Division people who, until recently, had spent most of their IBM careers marketing punched cards. Today Baird calls on hospitals and blood banks in the Midwest to demonstrate the new IBM 2991 blood cell processor. "And we market it," he says, "with the same spirit the company sells computers and typewriters."

Larry Myrick, manager of IRD's blood cell processor group, in Dayton, N.J., has brought together some of the division's best manufacturing and marketing people to make the new product a success. "We're going into medical technology in the same way IBM went into other new marketing areas," Myrick explains, "with a quality product supported by the very best in service and technical assistance."

IBM's blood cell processor is designed to "wash" the preserving additives from blood that has been thawed after having been frozen up to two years. The machine does the job at about two-thirds the cost of a manual system. The use of frozen blood is growing dramatically in the U.S. For even though it costs more, the freezing of stored blood prolongs its useful life.

"Take ordinary refrigerated blood," says Myrick, "you've got to use it within 21 days or dispose of it. But blood frozen mechanically or by the use of liquid nitrogen can be stored for as long as two years and used when needed. This is particularly important with blood that is in short supply, such as rare types or that suitable for transplant operations."

The blood cell processor has been generally well accepted. The first machine was installed last spring in the reference laboratory of Blood Services in Scottsdale, Ariz. Blood Services is the nation's largest network of nonprofit community blood centers serving more than 900 hospitals and responsible for the blood needs of 14 million Americans who live in one-fifth of the land area of the U.S.

"We think IBM has produced a superb piece of equipment," says Dr. John B. Alsever, vice president for medical affairs at Blood Services. "The de-

mand for frozen blood is increasing rapidly and the IBM blood cell processor does a superior job of washing thawed blood."

An increasing number of medical and blood centers are now using the processor, including the Central Blood Bank of Pittsburgh; the Naval Blood Research Laboratory in Chelsea, Mass.; the Cook County Hospital; and the American National Red Cross Laboratory in Bethesda, Md., where the blood cell processor was tested before being put on the market.

Chicago's Cook County Hospital, one of the nation's largest hospitals, is beginning to freeze its entire stock of stored blood. "Aside from long storage, frozen blood appears to have other advantages over refrigerated blood," Larry Myrick says. "The oxygen-carrying abilities of red blood cells become weaker as refrigerated blood ages. But the packed red cells in frozen blood lose almost none of that capability. However, refrigerated blood will be with us for the foreseeable future, primarily because it costs less."

One reason frozen blood costs more is that an additive must be put into the blood to preserve its cell structure. Then, when the blood is thawed, the preservative must be removed, a time-consuming and costly step. It is this extra cost that the IBM product is designed to bring down.

The IBM processor spins a unit of blood at speeds up to 3,000 revolutions per minute, using centrifugal force to separate the preservative from the blood. The centrifuge forces the red cells to the rim of the bowl and leaves the preservative in the center to be forced out into a collector.

Learning what they have to know about blood technology has been a formidable task for the IRD group. "We're all former card salesmen," says Wendell Bastian, who calls on blood centers in the Mid-Atlantic states. "We were hesitant at first to talk to doctors about hemoglobin and blood balances, even though we each did a lot of independent study when we took on this assignment. But I think we've learned a great deal and now feel much more comfortable with it."

Blood is actually a big business in the United States. Dr. Peter Van Schoonhoven, medical director of Blood Services, says: "In 1971, nine million units of blood were drawn from donors in the United States. But only seven million were used, indicating that perhaps two million units were lost because they had to be discarded after 21 days of storage. Frozen blood may help to eliminate some of that waste."

The blood cell processor is built at IRD's plant in Dayton. "Our production line is different," says Bowen Akers, manager of manufacturing and field services for the product. "Each of our technicians builds one machine at a time, from the ground up to the finished product. These people have terrific pride in their workmanship. They even keep track of how each machine they build performs in the field. When the cover got stuck on a machine in Atlanta, the technician who built it took the problem personally and tracked down the cause himself."

Now retired, IBM Fellow George Judson is the "father" of the blood cell processor, as he is of its companion product, the blood cell separator. He began working on blood technology in the early 1960s, seeking to build a machine that would separate blood into its components: white and red cells, platelets, and plasma. His interest was born of a personal tragedy. His 17-year-old son, who died in 1964, had been stricken by leukemia, a cancerous disease of the blood.

While his son was in the National Cancer Institute hospital in Bethesda, Judson met Dr. Emil J. Freireich, who was engaged in cancer research. Together they worked on the blood cell separator, which removes and separates blood into its components while the machine is connected to the patient.

The treatment of leukemia entails the removal of diseased white cells from the patient. It was a painstakingly slow process before the blood cell separator was developed.

Later Judson formed a biomedical group in the Systems Development Division at Endicott, N.Y. That group, now with the System Products Division, also developed the blood cell processor. Judson worked with two senior engineers, Dr. Robert Kellogg and Dr. Alan Jones, and an advisory engineer, Victor Kruger, on both projects.

When the first blood cell processor was installed in Phoenix, Dr. Kellogg and IRD President Sheldon Euler traveled to Arizona to see how it was working. "Those of us who have worked on the development of blood technology are delighted to see IBM making a major effort in this area," Dr. Kellogg told Euler.

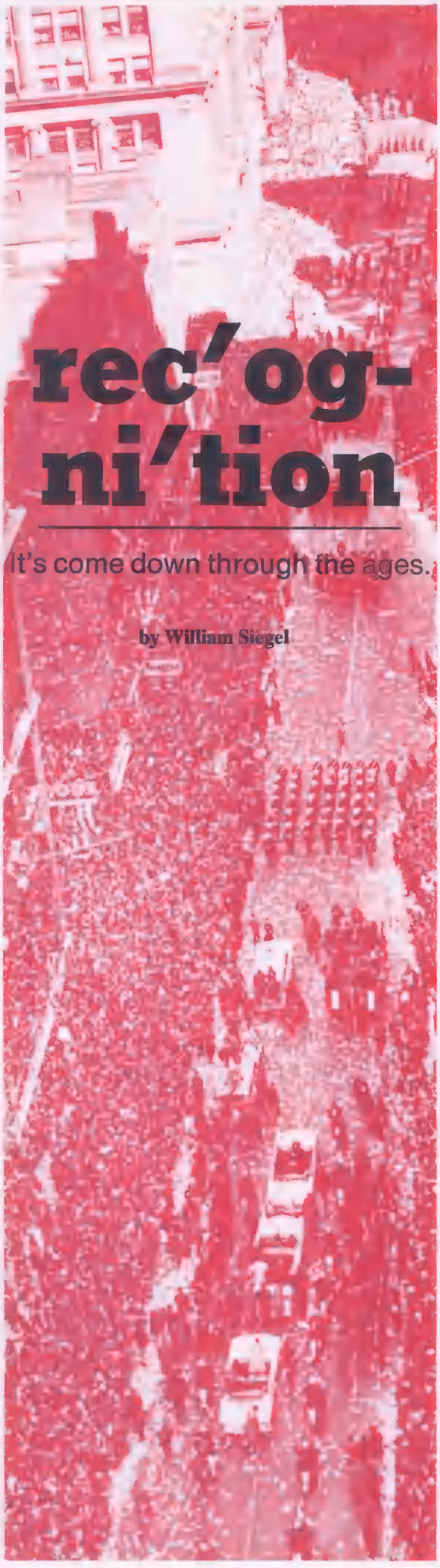
Adds Euler: "With a machine like this we've got the best of both possible worlds. We're doing good—and it's good for business." ■

Dr. Peter Van Schoonhoven, medical director for Blood Services (an Arizona-based organization), left, discusses operation of the IBM blood cell processor with IRD President Sheldon Euler; Dr. John B. Alsever, Blood Services vice president for medical affairs; and IBMers William Macnamara, Jr., Larry Myrick, Robert Kellogg (hidden), and Richard Wilhelmi.

rec'og-ni'tion

It's come down through the ages.

by William Siegel



In 1945, after a lifetime of research and experimentation, Sir Alexander Fleming was awarded the Nobel Prize for Medicine. His most important discovery, penicillin, ultimately has saved millions of lives.

In 1969, after devouring a pound of gherkins in four minutes and twenty-seven seconds, one Robert Harari was immortalized in the *Guinness Book of World Records*. It isn't known whether Harari ever got more for his trouble than a two-line notation and severe abdominal pains. But the Nobel Prize and the brief entry in the *Guinness Book* do have something in common: Both are symbols of mankind's universal need for recognition.

Recognition today takes many forms: honor rolls and merit badges; honorary degrees and Pulitzer Prizes. Finally, perhaps, an appropriate obituary. The concept behind every form of recognition is as old as the human race.

Admittedly, recognition in the dawn of recorded history was riskier than it is today. Men gained recognition for slaying enemies—who may have been seeking their own bit of recognition. Some ancient German tribes, a Roman historian has noted, made sure that everyone could tell at a glance who the most ferocious warriers were. Only men who killed an enemy were permitted to shave their beards. A town filled with clean-shaven men obviously was a place to avoid arguments.

Roman conquests and feats of arms are legend—soldiers overran most of the known world and victorious generals led triumphant parades through Rome. And the Roman soldier had a great incentive to win only favorable recognition. If a legion or unit disgraced itself in battle, it was subject to decimation; every tenth man was executed.

Athletes have been honored by all civilizations. As early as 3000 B.C., Egyptian murals depicted wrestling matches. The most famous organized games of all were the Greek Olympics. Citizens—amateurs—competed in track and field events for the honor of their city states and for the personal recognition symbolized by the laurel and by the wild olive and palm wreaths.

Perhaps the greatest recognition an athlete could receive then and now is adoration by a multitude of fans. In ancient Rome, the darlings of the public were the athletes who daily risked their lives in arenas and amphitheaters. Charioteers, often born in slavery, were elevated to heroes. Walls were covered with their larger-than-life portraits. If a charioteer was killed, the emperor's poets composed laments which they sang to the weeping fans.

It may not have been fair, but throughout history some people have been recognized for *who* they knew, rather than *what*. Titles and grants of land were forthcoming to Court favorites in early England.

A key element in recognition hasn't changed through the centuries. It always has been the symbol as well as the substance which counts. To the Greek athlete, recognition was the laurel. To the Roman gladiator, it was the *Rudis* (a wooden sword symbolizing freedom). In ancient Ireland, the Gaels, with a special spot in their hearts for the colors of the rainbow, saw to it that the more important you were, the brighter your clothes. The *Ard Righ* or High King of the Irish, wore as many as seven colors at once. The lowliest peasants on the Emerald Isle, the "Kerns," had no trouble matching suit and tie: They were allowed only a single color.

Today, multicolored clothing, laurels, and *Rudii* have been superseded by other forms of recognition. Take medals, for instance. The more medals, the greater the recognition. His Imperial Majesty Haile Selassie, the diminutive "Lion of Judah," is weighed down on occasions of state by more than 50 medals awarded him by world leaders.

Then there's the ticker-tape parade reserved for special heroes: Lindbergh, channel-swimmer Gertrude Ederle, John Glenn, or the New York Mets. A rough measure of the amount of recognition is the tonnage of waste paper. Glenn, for example, was showered with 3,474 tons of confetti—a record.

In the performing arts, applause, standing ovations, and curtain calls are symbols of recognition. In 1964, after a performance of *Swan Lake* in Vienna, Dame Margot Fonteyn and Rudolf Nureyev received 89 curtain calls.

Some have scorned recognition. Churchill said: "Vaccination is undoubtedly a definite recognition—of smallpox." Mark Twain put it somewhat differently: "Obscurity and competence—that is the life best worth living."

The significance of recognition—to the clean-shaven warrior, the athletes of Greece, or the IBM Hundred Percent Club member—is plain. Each has been honored for a job especially well done. Symbols and ceremonies may have changed with time, but the meaning and importance of recognition has been constant through the centuries. ■

William Siegel recently completed his master's thesis on a new historical interpretation of the Battle of Maldon, fought in England in 991 A.D., in which Danish marauders defeated the Earl of Essex. An historian, he currently is working on a history of Scottish-Gaelic antecedents of the American nation.

It's Club-time again

The season started with a real bell ringer for OPD in Miami. In all, there are some 40 recognition events scheduled this year.

The season has arrived.

And during the spring and into the summer, in cities around the world—New York and Miami Beach, San Francisco and Dallas, Lima and Caracas, to name a few—IBM's annual recognition meetings will be packing them in.

At first there was only the Hundred Percent Club, exclusive gathering for those who had made their year's quota in sales. Now, depending on the division involved and the function being honored, there are other similar meetings and many different names—the Forum, Golden Circle, Awards Conference, Technical Conference, Systems Engineering Symposium, Administration Information Exchange Conference.

In all, there will be nearly 40 different recognition events held throughout the world in 1974 by IBMers—some with thousands of people attending, others with a relative handful. The common denominator for each attendee: a successful 1973.

In the U.S., the season began with a rush in March* as the Office Products Division Hundred Percent Club met in Miami Beach. More than 3,000 qualifiers (in two sessions) made it the largest single Club in IBM history (the Data Processing Division has had more qualifiers, but not at a single meeting). A major reason, of course, was OPD's record of 115 percent of total quota.

Hard upon the heels of OPD in Miami Beach came DPD, with its Achievement Forum, the first event in a new format of recognition meetings, and one attended by nearly a thousand men and women.

The Achievement Forum is for those people who have not only made quota, but have "gone that extra mile, who have compiled particularly outstanding years." Other DPD meetings, also called Forums, are for qualifiers making their first Club, their second Club, and their fifth Club.

While DPD was meeting in Florida,

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* SRA's Club was held in January in Mexico City.

Miami
Data Processing Division

the Federal Systems Division, coming off a record year in sales, was honoring more than 300 of its best marketing and market-support people in New Orleans.

For the first time, FSD invited as guests of the division spouses of those qualifiers who attained their fifth Forum or any combination of five Forums or Hundred Percent Clubs.

The Information Records Division, which almost scored a magnificent IBM first by having every marketing representative qualify (207—96 percent—made it), held its Hundred Percent Club in the Hotel del Coronado, California, on the bay across from San Diego.

It was, obviously, a great year for IRD, the smallest of IBM's "integrated" divisions (those which have their own manufacturing and marketing capabilities).

Before the month was out, DPD had held a second meeting, its First Club Forum in New York City. Many of the almost 600 qualifiers were people who had made successful career changes into sales from administration, systems engineering, customer engineering, and various staff jobs.

Despite the different names and different audiences, the meetings in Miami Beach and New York and New Orleans and Coronado had a similar jaunty, lively quality. There were music and speeches (Frank Cary, for example, spoke at four of the five events), films and spectacular visuals, awards and honors, excitement and humor, professional entertainment—and an imposing potpourri of outside speakers which included an admiral, a congressman, a head football coach, a TV broadcaster, an economist, a psychiatrist, and a tough middle linebacker.

For many who attended, though, the best part was still the chance to compare notes with colleagues, catch up on old friendships, and, as DPD's then president, Ralph A. Pfeiffer, Jr., said: "Relax, get some fresh perspectives, get some new insights." ■

The officers backstage at DPD's Achievement Forum in Miami Beach: From left, Charles DeMory, treasurer; Paul Hollrah, president; John Loewenberg, secretary; and Charles Whetsel, vice president. Scaffolding in the background supports 80 projectors used for slide and film presentations on the Forum's theme, "Leadership."

For Bob Starpoli of the Poughkeepsie branch office, the first year on quota was difficult, to put it mildly. "If everyone who made quota in 1972 had gone to Miami, I should have gone to the Klondike in Alaska," he says. Starpoli, who decided to switch from Field Engineering manager to marketing rep in 1971, made it big in 1973. He sold a new account System/370 Model 145 to a utility, one of the largest sales ever made in his branch. He also sold and installed a couple of Model 155s and a System/7, ending up the year with an overall performance of 180 percent. "I find selling personally rewarding," he says. Starpoli finds golf challenging, too. At the Fontainebleau, he shot a 41 going out and a 48 coming in.

Left: Mary Lou Schwab of Chicago Distribution likes to talk about a computer-assisted instruction program that she sold to a large retail store. It's used to help train people to operate IBM terminals. The sale helped make Miss Schwab, a former systems engineer, one of the top marketing people from the Midwestern Region. She's been a member of a large-account team for the last year and a half, responsible for customer education. A former high school Spanish teacher, Miss Schwab enjoys the study of languages and other cultures, skiing, swimming, and tennis.

Right: Dave Reynolds, Hartford Manufacturing and Distribution marketing manager, is also a part-time skipper of the *U.S.S. Charles P. Cecil,* a destroyer. A reserve officer in the Navy, he takes the ship out of Groton, Conn., one weekend a month. As good a salesman as he is ■ sailor, Reynolds racked up a 1973 combined sales-and-install record of 194 percent. Included in that effort: three Model 168s, two Model 158s, two Model 145s, and ■ System/7.

Right: Two years ago, selling was the furthest thing from Art Powell's mind. The 29-year-old IBMer was a senior associate programmer with the Federal Systems Division, eager to switch into systems engineering. But his personnel manager urged him to go into marketing. "I had no idea what would follow," says Powell, who was named top salesman recently at DPD's First Club Forum (almost 600 rookies qualified). He went on quota at the New Jersey Public Sector branch in January 1973. His overall performance for the year: 629 percent of quota. What does he do when he's not selling? "Installing," says Powell.

What they said at the Clubs

"The free enterprise system serves the public because it encourages competition. The system serves the public because it encourages winning. To win, by definition, means a competitor must lose. The central issue which the Telex decision confuses is the right of our company—or any company—to take perfectly ethical business actions in order to compete . . . I have confidence in the judicial process . . . And one of the greatest things about it is the appeals process, which we're using to convey our facts and our logic to a higher court as forcefully as we can."

—Frank T. Cary, IBM *Chairman*

"I think OPD has a great sense of mission and a great opportunity in that mission. For, in essence, what you're doing is putting into the hands of American business the kinds of products it has never had before—products that can increase the productivity of your customer and his employees. And that's a tremendous value added—not just to the business enterprise but to people."

—G. B. (Spike) Beitzel

IBM *senior vice president and group executive*

"It is easy . . . to believe that everything boils down to hard facts . . . I don't believe that . . . One case concerned over 160,000 points of peripheral gear under heavy competitive fire. Big discounts. Tests carried out under hot-house conditions. The works. But we finally won . . . The pivotal factor was the relationship the account team had established with the customer. Our people had helped the customer in so many ways . . . that the customer regarded them as part of *his* team, an irreplaceable part of *his* operations."

—Dean R. McKay

IBM *senior vice president and group executive*

"A famous pianist practices six hours a day for weeks to prepare for a concert. If he misses even three days of practice, he says, 'my audiences can tell. If I miss two days, the critics can tell. But if I miss one day, *I* can tell.' . . . Each of us must make that personal commitment to excellence."

—Ralph A. Pfeiffer, Jr.

then IBM *vice president and* DPD *president*

"We've put OPD into a pretty steep climb . . . It's going to take all the skill we possess to reach the summit. But we wouldn't have set such tough targets if we did not have confidence both in our collective strength and in ourselves as individuals . . . We'll do it because of something we possess that no one else has or can take from us, a quality called the IBM mystique."

—Bart M. Stevens

IBM *vice president and* OPD *president*

"I think the tradition that IBM sells solutions to its customers' problems is more true of FSD than any other division in the corporation. Our business is to anticipate our customers' needs, and to be ready with the answers when they need them. We must constantly readjust our sights to thinking of new ways in which our talents can be applied. And if our world ever needed problem-solving capability, and people with new ideas, that time is now."

—John B. Jackson

IBM *vice president and* FSD *president*

Below: It started in Atlantic City, the site of IBM's first official companywide sales meeting. Thomas J. Watson, Sr., greeted the 52 qualifiers for the year 1924, known as the "Go Getters," and welcomed them to Boardwalk and St. Charles Place, the site of IBM's permanent showroom.

Nostalgia

The Club goes all the way back to the company's beginning. Next year will mark the 50th year it has been known as the Hundred Percent Club.

The discreet plush sign, with its neat white lettering, proclaimed that the "Go Getters" Club was meeting at the Hotel Traymore in Atlantic City. The year was 1925. And it is unlikely that more than a handful of the hundreds of guests at the hotel that January weekend had ever heard of the International Business Machines Corporation.

But there, amid the Byzantine turrets of the resort hotels that stretched along the world-famed Boardwalk, Thomas J. Watson, Sr., congratulated the 52 qualifiers for IBM's first companywide sales convention.

Their prompt response: a unanimous vote to change the name of the gathering from "Go Getters" Club to "Hundred Percent Club."

The 1925 session was IBM's first official Hundred Percent Club, but the concept and name predate it. Watson frequently said he borrowed the idea from his early days with the National Cash Register Company, where, one ancient photograph testifies, salesmen met under the watchful eye of a "marshal," replete with Keystone Kop star and shillelagh.

Earlier, predecessor companies of IBM, such as Tabulating Machine Company, had also met in sales conventions. In 1918, for example, bylaws were approved for a "100% Club of the Tabulating Machine Company." Rules for qualification haven't changed: "Membership in this club shall be vested in every member of the Tabulating Machine Company's sales force who, in the course of the year, shall have produced a record of 100% or over of . . . quota . . ."

"You can elect yourself," advised a 1917 editor of the company's newspaper, the *T. M. Business Record,* "by making your every minute and move count." Watson, himself, referred that year to the "Hundred Percent Salesman," at a

Left: Nowadays, IBMers refer to the main meeting room as the "main tent," and for good reason. Back in the Forties, the company held its Hundred Percent Clubs in Tent City, Endicott, N.Y. The central meeting place was actually a tent, 38 feet high, 98 feet wide, and 188 feet long, supported by four masts. Surrounding it were over 400 two-man tents and dozens of service tents, complete with telephones, electricity, baths, gas water heaters, and a 100,000-gallon water supply in a special concrete reservoir.

Right: In 1936, Club qualifiers met at the Waldorf-Astoria in New York. At the opening session, the IBM Band played the company's marching song, *Ever Onward*. Executives presented one-minute addresses. On the second night of the Club, members met at the Majestic Theater to see Beatrice Lillie, Ethel Waters, Herb Williams, and Eleanor Powell in *At Home Abroad*.

Right: The dress may have been appropriate for business, but it did seem slightly out of place in July 1948 as 1,000 qualifiers arrived by train to spend three days on the rolling hills of Tent City. Their temporary homes were two-man tents, each set on a raised wooden platform, each covered with white canvas, and topped in blue. Nearby, an exhibition tent—42 feet by 110 feet—housed the entire product line.

sales meeting at Tabulating Machine Company headquarters, 50 Broad Street, New York. "Seek out the qualities of "health, honesty, ability, industry, and knowledge," Watson advised his salesmen. "Put all these things in your hearts, and put your hearts in the business."

From 1933 to 1939, the Clubs met in New York City's new Waldorf-Astoria Hotel.

Midway in the Great Depression, on a bitter cold January day in 1936, Watson urged Club members to attack adversity with "Five C's: conception, consistency, cooperation, courage, and confidence." His audience: those salesmen who had attained quota despite the grimness of the times.

The 1938 Club, meeting in the spring of 1939, saw President Franklin D. Roosevelt open the World's Fair and Watson inducted into IBM's Quarter Century Club.

A year later, the Club site was switched to Endicott for a series of unique conventions in "Tent City." Housed in tents amid the rolling green hills of upstate New York, thousands of IBM salesmen between 1940 and 1950 met, dined, and were entertained, exchanged business ideas, and were urged on to greater accomplishments.

The Club—in all its changing shapes and formats—has been a long-standing tradition—with minor exceptions. During World War II, Clubs were suspended. In 1951, qualifiers for the previous year were honored at their local offices because of curtailed travel during the Korean War.

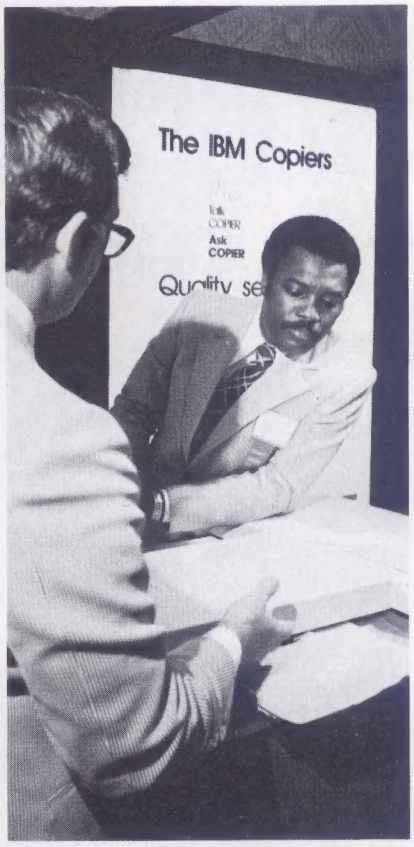
As IBM grew rapidly during the next two decades, Clubs kept pace. There were Clubs that honored not only the men —and then the women—who sold data processing equipment, but office products, data processing supplies, educational materials. Whatever the product, the spirit has remained upbeat—just as it was back in '25. ■

Miami
Office Products Division

Above: Doug Van Schaik, left, greets IBM Chairman Frank Cary at the OPD Club in Miami's Fontainebleau Hotel. Van Schaik, 30, Club president for the second year in a row, sold 218 percent of total quota during 1973 despite a late start. Until May, he was busy with equipment installations, serving as Club president, and attending both a World Trade Club and the Golden Circle. "Then came a brief panic," says Van Schaik with professional cool. He isolated himself for a week, laid out a plan for the rest of the year, and made effective use of his mobile office, a '71 VW squareback. His wife, Nan, was quite understanding. She's an advanced marketing support rep in the Newark office.

Right: OPD's marketing force is a young, energetic group, three-fourths of them age 34 or under. Seventeen percent are women, including Judith Hine, 30, a marketing rep from Indianapolis. Attending her second Club, she talks with George Zucchi, magnetic keyboard product programs manager, about the new IBM Memory Typewriter on display at the OPD Club. Mrs. Hine, who worked in Toronto as World Trade's first woman OP sales rep, moved to Indiana early last year.

Left: Four Club officers take time out for an informal portrait. From left, Vice President Mike Laughlin, industry manager at the Chicago O'Hare office; Secretary Burt Freiman, industry manager from Anchorage; Treasurer Joe Zotter, a rookie from San Mateo; and President Doug Van Schaik from Morristown, N.J. At a district breakfast, Freiman pointed to his Anchorage colleagues: "Our office vibrates. It's more than an office, it's a neighborhood."



Above: Don Sanford, right, was one of nearly 900 rookies at the OPD Club. A teacher for five years in Clinton, La., the 28-year-old sales rep joined IBM's Shreveport office early last year. He likes his job because of "the potential income, the variety, and the exchange of ideas with many different people." He finished the year with 120 percent total quota and sold twice his Copier quota. He's talking with Ron Hollnagel, marketing manager, Des Moines.

Left: Ragtime, blues, jazz—the IBM band plays during a coffee break at the Fontainebleau. Veterans and rookies tapped to the same beat, including Dan Maher (right, wearing glasses) and Rob Alschbach (to his left). Territory manager for Copiers, Dallas Downtown, Maher was attending his 15th Club. For Alschbach, Dallas North systems marketing rep, it was Club number 11.

New Orleans
Federal Systems Division

Above: At FSD's Forum in New Orleans, eight men received the President's Award, given annually for "sustained and outstanding performance" and "contributions to major programs and contract awards." Since the division set a new record for sales last year, there were plenty of candidates. The winners were, left to right: Clint Grace, Manassas; Bob Grimesey, Bethesda; Chet Sturgeon, Owego; Jim Brown, Gaithersburg; Bill McClain, Owego; Bob Jung, Washington, D.C.; Walt Harner, Gaithersburg; and Don Upton, Manassas.

Above: As more than 500 members, spouses, and guests awaited the start of FSD's sixth Forum, the Olympia Marching Band—long a New Orleans favorite—came strutting through part of the movie screen on stage, playing *When the Saints Go Marching In.*

Coronado
IRD

Left: Last year, Gary Michelson served as vice president of the Information Records Division Hundred Percent Club. This year, he moved up. Club President Michelson accounted for $1.2-million in revenue last year, including 372 disk packs, a division record. IRD President Sheldon Euler congratulates the 31-year-old salesman during a break at the castle-like Hotel del Coronado, across the bay from downtown San Diego. There, 207 qualifiers—96 percent of the division's sales force—met for four days of business sessions, skits, and relaxation.

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1899

Snapshot at an early recognition meeting: The year was 1899, and the men are agents of the Bundy Manufacturing Company gathered in Binghamton, N.Y., for their first convention. In the front row, third from the right is Harlow E. Bundy, pioneer of the International Time Recording Company. That company was joined with two other firms in 1911 to form the Computing-Tabulating-Recording Company, predecessor of IBM. Bundy Manufacturing, one of the forerunners of ITR, made time recording devices. For a look at how forms of recognition—including the Hundred Percent Club—have evolved over the years, please turn to page 40.

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